

The Iron Age

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A Review of the Hardware, Iron and Metal Trades.

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The Breakage of Sheet Rolls.

James Mallen, of North East, Md., writes as follows to the *Bulletin*:

A pair of sheet rolls when in the housings ready for work presents the following appearance in looks and shape: On critically examining the rolls it will be seen that their surface is covered by minute cracks, running zigzag, the cracks extending rather longer around the roll. It will also be seen by looking between the two rolls as they stand in the housings, if the rolls have been turned properly, that you can see between them up to the extreme end of each, where they bear on each other, with the opening largest in the middle, and tapering gradually toward each end. The size of the opening between a pair of 40-inch rolls is about the thickness of a No. 22 wire gauge, .028 of an inch on tight-iron mills; on loose one-half of this.

When iron is put through the rolls this opening closes or the centers of the rolls expand, until it is about even with the ends where the iron does not touch. On the cooling off of these rolls, say at the end of a week, it will be found that the bearings of the two rolls extend inward several inches on each side—that is, you cannot see between them to the extreme ends as you could when they were turned before working on them. To explain this more fully to those not posted in the operating of sheet rolls, I will state that when the rolls are first put in the housings they only bear on the extreme ends, but after working on them a day or two they will bear on each other 1 or 2 inches, so you have to work narrower iron as these bearings come out toward the center. The center of the rolls wears more proportionately than on either side, and consequently it will readily be seen by gauging the iron, when the rolls are full or level across, that the iron is of uniform thickness, but when they are not the iron is thicker in the middle than on the edges. Now, when these rolls are turned again you will find, without critically examining them, that the whole of their surface is covered with cracks much larger than before they were used, and extending around the circumference in a zigzag manner, and so on for the first two or three weeks, when the metal in the rolls seems to have taken a fixed position to all outward appearances.

Now, then, in regard to the breakage of these rolls. They generally break in the center, but occasionally one will break a few inches on either side of the center. A few years ago they would often break in the necks, close up to the barrel of the roll, but of late years makers have overcome that by making the necks heavier. Nine times out of ten the top roll breaks, and if you ask a roller what the cause is he will generally state that the contraction and expansion break the roll; but I find that this is not all that breaks the roll and that there are two causes for breakage. One of these is putting iron that has not been thoroughly heated between the rolls, the intense pressure that the roll has to withstand while in a heated state causing it to break. But sometimes a cold piece of iron will not break the roll through, but merely crack it. This will show on the iron in the sheets, and I have known rolls to run in that condition for a month and then to part with nothing in the rolls, leading many to suppose that the simple contraction and expansion caused the fracture. I earnestly believe that if the iron is thoroughly heated, and rolled in that state, the breakage of our rolls will be brought down to a minimum, or that the breakage will be the exception instead of the rule. But one of the great troubles is to get men who will give this their special attention.

The other cause is the fault of the manufacturers of rolls. On examination of several rolls that have been broken I find that the chill is very uneven in most of them, varying from $\frac{1}{2}$ to $1\frac{1}{4}$ inches in the same roll. Then, again, there is a semi chill extending part way around the roll, and on the rest of the roll the chill stops abruptly, after extending $\frac{1}{2}$ inch, while in the part where the semi chill is it enters $1\frac{1}{2}$ to $1\frac{3}{4}$ inches, making five-eighths chill and the rest semi-chill. My opinion is that where the chill is uneven on a roll it does not expand evenly, thereby forming a cam on the surface, and when this cam comes opposite to the other roll, and a piece of iron is between them, it makes an enormous pressure at that point, causing the roll to break.

Now, what causes this uneven chill I am unable to state at the present time positively, but think it is caused by the unevenness of the chilled plates in some instances, and again by the roll manufacturers, for when some of them discover a crack in the surface of the roll after casting they center it on the lathe so as to cut the part where the crack is, thereby making an uneven chill around the roll. Then, again, I am led to believe that by the close competition among rollmakers to meet prices they use an inferior grade of iron, causing the rolls to be weaker and to break more easily.

In regard to the bearings wearing in on the rolls used for finishing on tight mills I find that can be remedied to a certain extent. In tight iron mills they use two pairs of rolls, one for breaking down, the other for finishing. On the break-down rolls they are geared with hoisters to raise the top roll, and that keeps it off the bottom one so that

no wear can come on the ends by running together; but on finishing rolls the top roll is driven by friction, so that when the rolls are not in use rolling iron they are still wearing on the ends as long as the mill runs. Now, this can be partially obviated by hav-

again say the reverse—that the bottom roll should be concave and the top straight. My own experience is that both rolls should be turned exactly the same, that is, both concave, and that one roll heats as fast as the other, and that the expansion is the

The Daelen Corrugating Mill.

So much interest attaches to the manufacture of iron roofing in this country that we are warranted in devoting large

these ideas, all of which in the estimation of their users answer a very good purpose. What we present herewith, however, seems to resemble neither of these.

At a meeting of the Berlin section of the German Society of Engineers, Herr Schneider presented a paper on the corrugating mill invented by Vital Daelen and handled by Bachmeyer & Co., Berlin. The principle underlying the construction of this mill differs radically from principles hitherto employed in designing machinery for corrugating sheets. While it is of course impossible to weigh its merits as compared with the methods in vogue here, the reports concerning it from Germany are encouraging.

In Germany, progress seems to have followed until now pretty much the same lines in which it has developed in this country, though we are inclined to believe that mechanically the machinery here used represents more effective appliances. Daelen, however, as we have already stated, departs from the usual principles which underlie grooved rolls or presses. The mill consists of two rolls, the lower stationary and the upper adjustable vertically during the operation. The rolls are provided with forming rings, which in their turn can be made to slide along the rolls, simultaneously participating in their rotary motion. The forming rings are moved horizontally with the aid of spindles cut right and left.

The construction of the lower roll may first be considered. With it the central forming ring is wedged tight, while the others are moved by spindles toward the central forming ring in such a way that the ring next on the other side to the central ring moves to the extent of $72\frac{1}{2}$ mm. (2.85 inches). (In the case of the depth of corrugating being 100 mm. (3.94 inches), while those placed at a greater distance from the central forming ring move 153 mm. (6.02 inches), and the last rings in the series pass over $229\frac{1}{2}$ mm. (9.01 inches). In this case all the forming rings of the upper range are movable, and by suitable gearing are so moved that they remain exactly in the center of the corresponding forming rings of the lower roll, while the upper roll is being run downward toward it. It will be seen, therefore, that all the forming rings always approach in equal distances from one another from right and left to the center as soon as the gearing is set in motion. This is shown in Fig. 9 (page 5) where, it will be observed, the positions of the two lower rings are successively marked and the final places of the series of rings is shown in the lower part of the drawing. All that is necessary furthermore is to adjust the gradual descent of the upper toward the lower roll at a rate proportional to the sideways movement of the forming rings on both rolls. This is done by peculiarly constructed cam disks. These cam disks by which the top roll is lifted or moved downward must form spirals, which at the beginning of the stroke cause a rapid descent, gradually slowing as the full depth of corrugating is reached. The mill is so formed that both movements, the lateral approach of the forming rings and the descent of the upper roll, can be effected from one point, and both of them are positively connected. By turning a hand-wheel, two friction couplings are thrown into gear, and by suitable cog-wheels the spindles and cam disks are simultaneously driven. If by means of the hand-wheel the couplings are thrown out of gear, the whole works is simply a rolling mill, and it is possible when the sheet has been corrugated to a certain depth to roll forward and backward without the slightest change in the position of the forming rings taking place. It is necessary to be able to work with the mill in this way, because the downward movement of the upper roll and the lateral displacement of the forming rings takes place while the machine is running, so that the sheet is rolled conically, the corrugations at that end of the sheet which was last exposed to the action of the corrugating rolls being deeper than those at the other end. Therefore, when the sheet is started through the corrugating rolls and is thus unevenly corrugated, the adjustment is thrown out by means of a hand-wheel, and the sheet is rolled through backward so as to give a uniform section. Then it is thrown into gear again, and this proceeding is continued until the required depth of corrugating is attained. The following advantages are claimed for this sheet corrugating mill:

Entire independence as to the gauge of the sheet to be rolled and as to the depth and form of the corrugations, so that, for instance, sections with rectangular instead of circular corrugations can be rolled which, on the whole, are relatively stronger and afford a better opportunity for their use for architectural purposes. The strain upon the material in corrugating is reduced to a minimum, because the sheet is folded in a natural manner without causing injurious friction, and therefore sheet iron inferior in quality may be corrugated without serious waste. Besides the rolling can be done hot, which is possible because all the corrugations are produced simultaneously and in a short time, and not, as in ordinary appliances, one by one, so that cooling of the sheet does not take place and subsequent heating is not necessary. The power required is less, because the sheet is corrugated only at a comparatively small section of its entire length. In order to make all

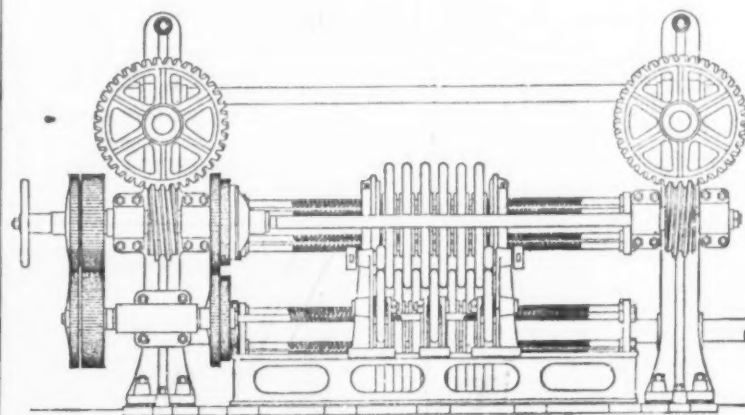


Fig. 1.—Front Elevation.

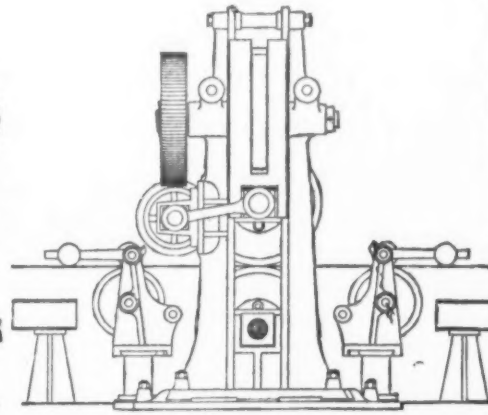


Fig. 2.—Side Elevation.

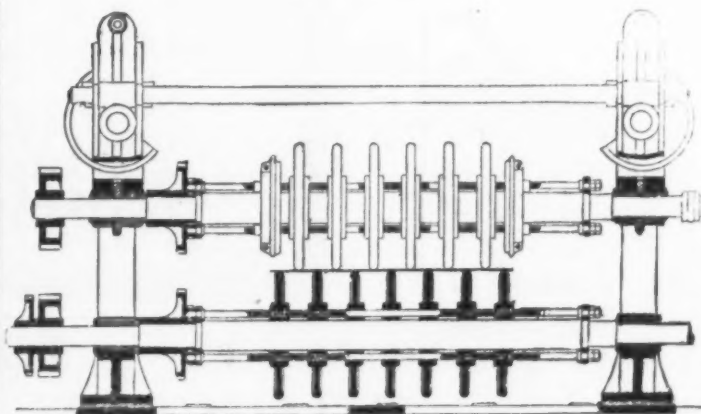


Fig. 3.—Longitudinal Section.

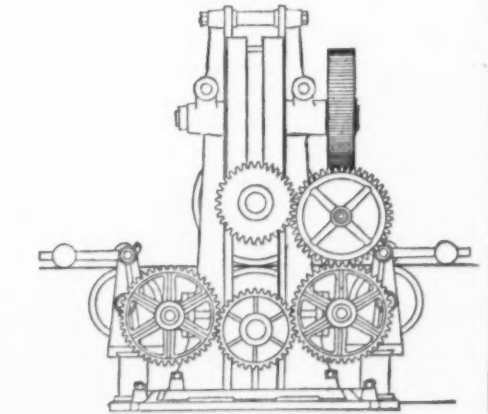


Fig. 4.—Cross Section.

Figs. 1 to 4.—Daelen Corrugating Mill with Closed Housings.

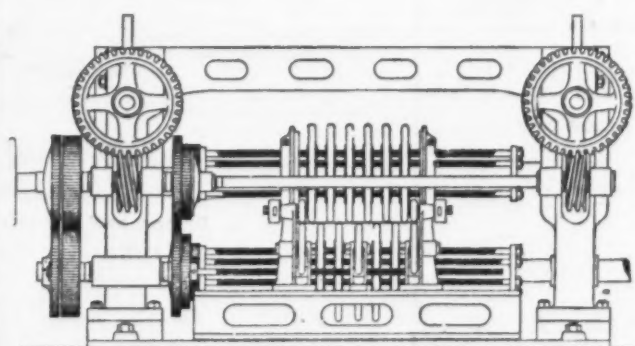


Fig. 5.—Front Elevation.

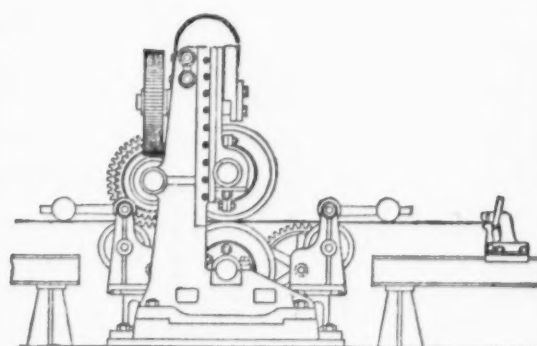


Fig. 6.—Side Elevation.

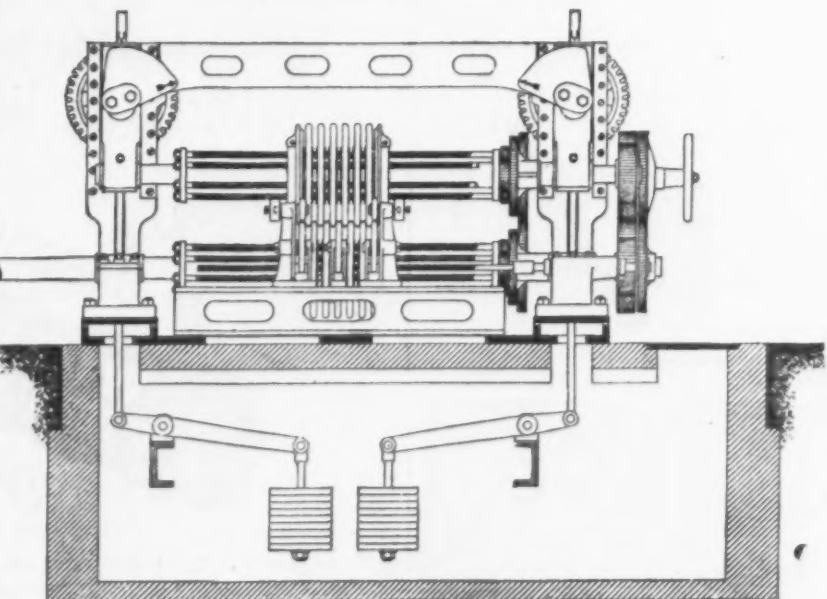


Fig. 7.—Front Section.

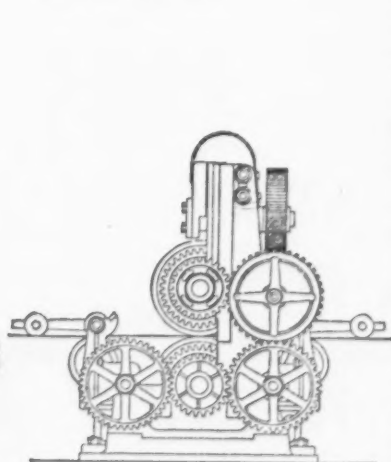


Fig. 8.—Side Section.

Figs. 5 to 8.—Daelen Corrugating Mill with Open Housings.

THE DAELEN CORRUGATING MILL.

ing hoisters on finishing rolls so adjusted that when they come to finish the iron the top roll can be driven by friction.

Another important thing to be taken into consideration is the turning of rolls. Some roll turners contend that the top roll should be concave and the bottom straight, the reason given by them being that the top roll gets hotter than the bottom one. Others

same in both rolls. Another important thing in the preservation of sheet rolls is to see that your roll turner is a good, reliable man, and that he takes no more off the roll than is necessary; the center of a roll should only be thinly skinned, for the chill of a roll is in reality its life; when that is gone the roll is of no account except for old metal.

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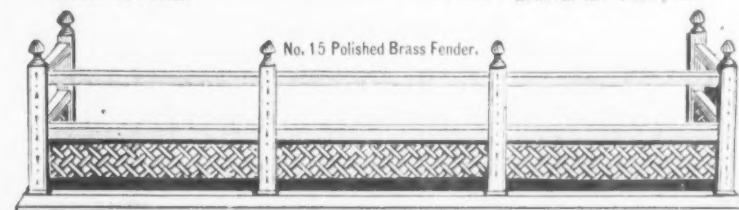
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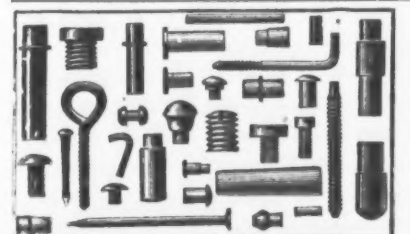


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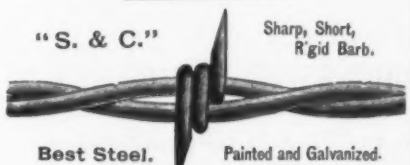
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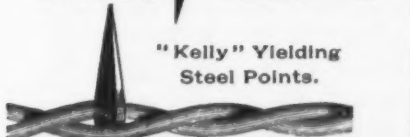
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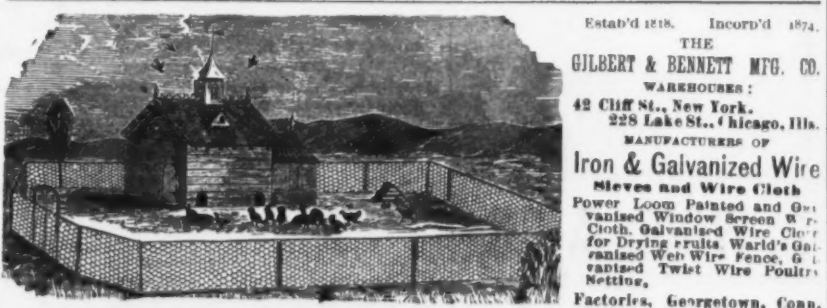
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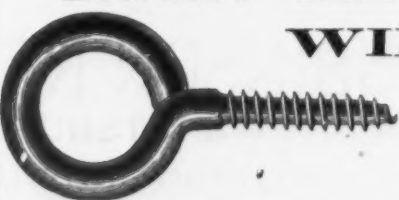
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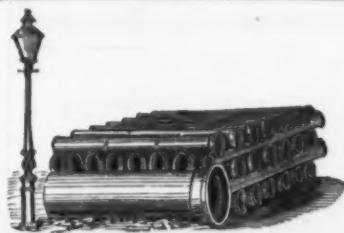
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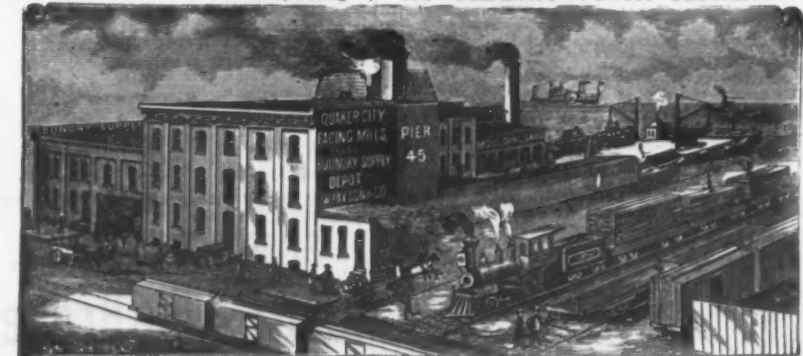
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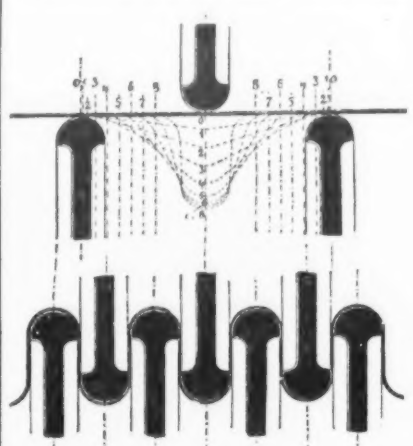
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Each Pig marked exact chill depth (3/4 in. to 1 1/4 in.).
A. Whitney & Son's standard test.
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Iron Founders,
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Established 1847.

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CAR WHEEL WORKS,
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Special Wheels for Furnace and Mine Cars.

the ordinary sections, three sets of rolls only are necessary, so that changes occur rarely and call for only a small loss of time. For producing corrugations of different depths, but of equal width, a change only is necessary in the cam disks in order to make the approach of the upper roll more rapid or slower, as the case may be. The force required with one train is simple, since all the movements are automatic. What is required is one man at the hand-wheel to throw the corrugating gear in and out, the engineer at the reversing apparatus and two men, one each at the front and back. On an average the total capacity per shift is 10 tons. In Austria the Teschen works have purchased a patent, and a mill with closed housings has been put up at the Carlsruhe. In this mill 5 mm. (0.2 inch) sheets are corrugated to a depth of 200 mm. (7.87 inches). A license for the western part of Germany has been given to the Dillingen Huettner-werke, and at that point a mill with open housings has been put up.

The accompanying engravings show in Figs. 1, 2, 3 and 4 the mill with closed housings, the upper two representing the position of the forming rings when the corrugation is completed, and the lower two the position of the rolls and forming rings



The Daelen Corrugating Mill.—Fig. 9.—
Position of Forming Rings Before and after End of Corrugating.

when the sheet is first passed into the rolls. Drawings 5, 6, 7 and 8 show a mill with open housings, the upper two indicating the position of the mill when open, and the lower when finishing the corrugating.

Avesta Steel.
Mr. Arvid Sjogren, superintendent of the rolling mills of the well-known Avesta Company, of Sweden, is now introducing into this country the products of that concern, consisting chiefly of plates and sheets, although a mill is now being built to make bars. We have had occasion repeatedly to refer to the methods of manufacture at Avesta, to which nothing need be added now. So far as the stock used is concerned the following range of constituents as determined by Th. Norelius, in soft steel, may suffice to show its purity:

Phosphorus	0.040 to 0.045
Sulphur	0.007 to 0.010
Carbon	0.007 to 0.008
Silicon	0.007 to 0.008
Manganese	0.28 to 0.30

The extraordinary ductility of the steel produced is well shown by samples of deep cups hammered from flat circles. A test piece strained to rupture was welded, and when again put into the testing machine broke at another place, thus showing how well it can be welded.

The following tests of 65 soft steel boiler plates will show the quality of the material and its uniformity:

Number of tests made.	Brand.	Original thickness, mm.	Break'g stress in English tons per square inch.	Elongation at break, per cent. on 200 mm.	Contraction of area in per cent.
2	A	8	94.76	26.5	64.5
14	A	9	24.25	26.9	65.4
7	A	10	24.32	25.7	65.3
5	A	11	23.87	26.3	64.0
15	A	12	24.00	26.4	65.8
4	A	13	23.18	27.4	68.2
8	A	15	23.62	26.0	68.9
10	A	18	23.24	25.7	69.0
Mean		12.3	23.91	26.24	66.14

Mr. Sjogren has established temporary offices at the Astor House, in this city.

An interesting horseshoeing contest took place at the Detroit Opera House, February 8, between John Campbell, of Buffalo, and M. J. Dunn, of Detroit. Each contestant had five helpers. In addition there were two judges and the referee, making 15 persons prominently engaged in the act. Each contestant was provided with two forges. The iron used by Campbell was furnished by Geo. Westerman, a Lockport, N. Y., iron merchant, and Roehm & Davison, of Detroit, supplied Dunn with metal. The iron was in straight bars, 12 inches inches long and 1 1/2 in width and thickness. Each man was to make a horseshoe out of the straight bar, and the one who completed his rooth shoe in the shortest space of time won the match and stakes of \$250 a side. The contest created a good deal of enthusiasm, Dunn winning in 1 hour and 40 minutes.

An Interesting Experiment.—Professor Lowe has recently made some interesting experiments in rearing plants in an atmosphere warmed by burning his fuel water-gas from open burners in a room containing the plants. He finds that the moisture produced by the union of the oxygen and hydrogen of the water-gas, while burning, is just what plants require for their fullest development, and that the atmosphere thus treated is equally beneficial to persons who are compelled to remain indoors.

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For Circular, Mulay, Mill, Gang, Pit and Cross-Cut Saws.

Sheet Steel

For Springs, Billet Web and Hand Saws, Shovels, Cotton Gin Saws, Stamping Cold, &c., &c.

SIEMENS-MARTIN (Open-Hearth) PLATE STEEL

For Boilers, Fire Boxes, Smoke-Stacks, Tanks, &c.

All our Plate and Sheet Steel being rolled by a Patented Improvement, is unequalled for surface finish and exactness of gauge.

ROUND MACHINERY CAST STEEL

For Shafting, Spindles, Rollers, &c., &c.

File, Fork, Hoe, Rake, R. R. Frog, Toe-Calk, Sleigh-Shoe and Tire Steel, &c.; Cast and German Spring and Plow Steel.

Finished Rolling Plow Coulters, with Patent Screw Hubs of Steel Center Cast Plow Steel. Agricultural Steel cut to any pattern desired. Attached. Old Soft Center Cast Plow Steel. Steel Forgings made to order.

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BRIDGE PLATE,
SKELP
SHEET IRONS,
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WIDE SHEETS.

Iron, Steel or
COMPOUND
**ARMOR
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UP TO 18 INCHES THICK.
GUARANTEED TO STAND
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STEEL OR IRON PLATES
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(Patent Levelled,
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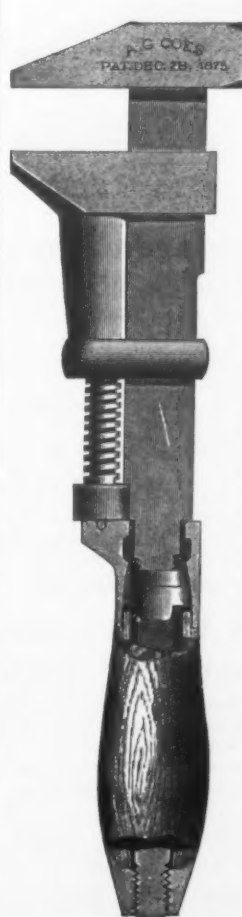
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The Strongest Wrench made, and the only successful re-enforced bar.

The Ferrule is firmly secured in place by a nut screwed on the bar.

Particular attention is called to the way in which the handle is made and fastened to the shank.

This Handle is made better and stronger than heretofore by using our new Cup Tip at the end which encloses the wood and keeps it from splitting.

This is the only wrench which has the wood handle firmly secured and held together at each end, and it will stand more rough usage and last longer than any now made. It is not affected by heat, cold or moisture.

None Genuine unless Stamped,

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PATENT COMBINATION WRENCH.

Case-Hardened Throughout. Parts Interchangeable.

This Wrench not only contains the superior qualities of a Gas Pipe Wrench but also all the requisite adjustments of a regular Nut Wrench, thus making a combination which has no equal.



No. 3 PATENT PIPE WRENCH.

The serrated jaws of the Wrench are interchangeable; that is, the same serrated plate may be used for either the stationary or sliding jaw, so that if one plate is broken another can be furnished adapted to either jaw without extra cost. The all-steel nuts and various parts are also interchangeable, thus easily repairing the Wrench at very small expense and with as perfect practicability for further use as when the Wrench was new.

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Maple Wood Ped. Highly Polished, with Leather Lining. For Sale in every City by the leading Jobbing Trade. This celebrated Faucet is equalled by none. The only standard Faucet suitable to use for Wine, Liquors, Beer, Ale or Vinegar, which will not form verdigris. They are put through a patent process which makes them impervious. Beware of imitations, such as keys made of lead, iron and other inferior metals, nickel-plated, which will in every instance form poisonous metallic corrosion. None genuine unless stamped thus: John Sommer's Best Block Tin Key.

World known John Sommer's First Quality Cork Liner Faucets, all labeled with the name. Everything in the Wood Faucet Line. Diamond Lock Faucets, Rosewood Faucets with Block Tin Key, Rosewood Faucets, all wood, Maple Wood Faucets, all wood, Lignumvitae Key Faucets, Cherry Faucets, Butternut, Black Walnut, Locust and Red Cedar Faucets.

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Exhaust Pipe Condensing Head.

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The Exhaust Steam Condensation from Exhaust Pipes of Steam Engines, when discharged above roofs and alongside of walls, will, in a short time, destroy the roofs and wash away the mortar in brick walls, as this condensation is always of and therefore very destructive. This Condensing Head will entirely avoid any such difficulty and thoroughly protect the roofs of buildings and sides of walls. The Condensation can also be utilized again, which will reduce the water rent. There is no back pressure on the exhaust, and the escape is noiseless. Send for Price List.

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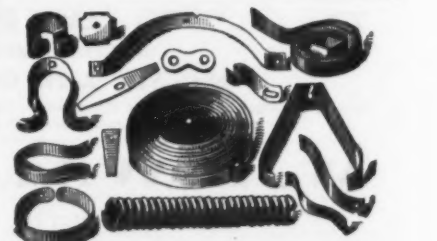
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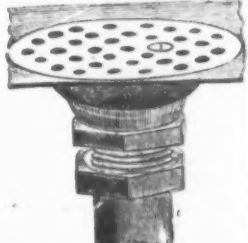
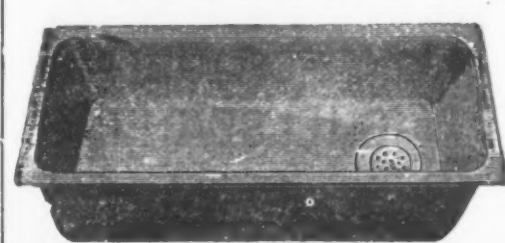
Fig. 120.



Fig. 200.



Fig. 70.

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We are informed that various parties are infringing upon the widely-known Letters Patent granted originally to **GEORGE F. WEYMOUTH** for an improved Hay Knife. The invention patented to **GEORGE F. WEYMOUTH** is embodied in a sword-shaped blade provided with operating handles for working the same, the edge of the sword-blade being furnished with knife-edged serrations or teeth. **IT IS OUR PURPOSE TO PROSECUTE ALL INFRINGEMENTS,** and to hold responsible to the full extent of our ability and of the law all parties who manufacture any knife infringing upon the patent, or who deal in the same. Several suits are now pending in the U. S. Courts. **IT IS ALL MANUFACTURERS AND DEALERS** are hereby warned of our rights, and the public are cautioned against purchasing any Hay Knives, made as described above, which are not of our genuine manufacture.
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IMPROVED BY M.M. BARTLETT.
Improvement Patented April 28, 1885.


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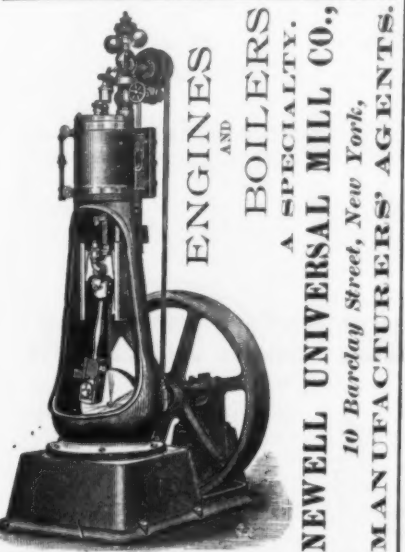
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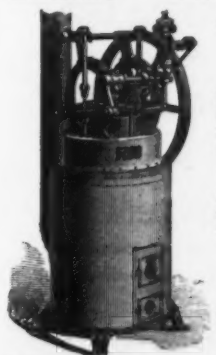
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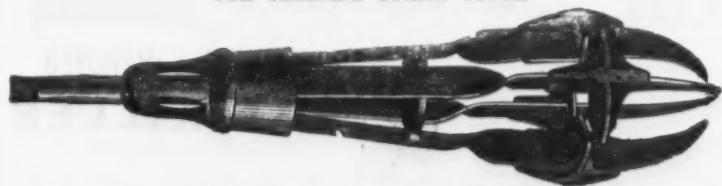
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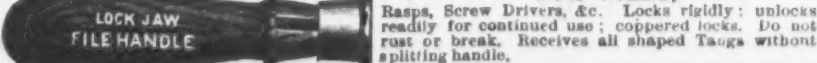
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SIX REGULAR SIZES IN STOCK.

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English Letter.

(From Our Regular Correspondent.)

LONDON, January 31, 1887.

THE WEEK

has been characterized by several rather unfavorable symptoms, almost the whole of which may be safely attributed to the war scare which has been indulged in by some of the newspapers. The "principals" in the expected tragedy, Prince Bismarck and General Boulanger, both deny the blood-thirsty projects with which they are being credited, but there is a widespread impression that they both protest too much. The public here and on the Continent seem to think that the deeds of both the countries chiefly affected belie the words of their respective leaders, and it is generally asked why so much feverish activity is being displayed in bringing hundreds of thousands of men into the field if they are not to be used. Broadly, indeed, there is much fear that war may be precipitated at any moment, either by some untoward incident between French and German civilians or soldiers, or by some rashness of the Czar of Russia in connection with the Bulgarian incident. The war correspondents of our dailies are "booted and spurred," ready to depart immediately into France and Germany, and they all believe that the new holocaust will begin this side of Easter. The universal hope is, of course, that no such terrible consequences will come about, yet the imminence of the fight seems so great that men of business cannot possibly avoid taking it into account in making their arrangements. That being the case, the iron and all other markets here have experienced a retrogression to some extent during the week. Were war actually declared it is pretty certain that prices would at once go up and there would be a new period of roaring activity, but while all is uncertain nobody knows what to do, and values suffer accordingly. The uncertainty is especially damaging and irritating to speculative operators, who cannot, by any possibility, cover themselves against two contingencies which are so utterly beyond their control.

Apart from the effects of the war rumors, there is a suspicion that the rise in iron may have seen its best point for the present. The advance was so rapid that it did not seem likely or able to prove enduring, consequently the "old hands" of the trade are chuckling at their own presciences and foretell a general relapse during the next few weeks. Whether they are right or not yet remains to be seen, but it may be worth while to point out that the drop now witnessed arises largely from the sales of speculators, just as the recent rise was caused by their purchases. Meantime it is beyond question that there has been a very marked development of the demand for consumptive purposes, along with which have been numerous purchases of iron for shipment directly the navigation season has fairly been opened. Further, it is only right to mention that the demand from the United States continues for certain iron and steel products, as well as for hardware and cutlery. That demand, even if it is not so large as it is commonly reported to be, is undoubtedly much above an average, and is, therefore, of correspondingly augmented benefit to our manufacturers. In this connection I may say that great attention is being paid to the strikes and labor troubles now in progress in the United States. The longshoremen of New York may or may not affect imported iron interests, but it is supposed that the agitation of the miners and iron-workers must result in changes which will give British iron and steel a better chance. It is assumed, also, that the men on your side will not long stand a nominal card rate on iron which is generally supposed to be from 1/2 to 1 cent 1/2 lb. below the actual selling price. It is inferred, of course, that the main object of keeping down these nominal quotations is to deceive the foreign producers and keep them out of your market, but if I am correctly informed those likely to be concerned on this side are ready to take their chances at the right moment, and will be able to supply any demand which may not be met by your own producers.

Speaking of labor troubles, as I did just now, reminds me that we have our own difficulties in that direction. Bolckow, Vaughan & Co.'s steel workers, about 2000 men, are out on strike to-day for an increase of 10%, and the works have been closed, the management declining to give any advance prior to the end of March. The company have refused arbitration, saying there is nothing to arbitrate upon. In Scotland large numbers of the coal miners are on strike for higher wages, and their action will speedily affect the iron works unless the dispute is settled. The ironworkers of the whole country are trying to foment an agitation, and are about to hold a conference having for its avowed object a general rise in the rates of remuneration of all grades of ironmakers at the earliest possible date.

THE IRON MARKET

has not been quite so firm, and there has been a disposition on the part of speculators to take breathing time, which has been emphasized by the war scare and the seriously threatened labor difficulties. Nothing has been done to reduce the stocks in makers' yards or in the public stores; but, on the contrary, the quantity in the latter has been slightly increased. Shipments to America have been nearly 50% below what they were a year ago, although to other ports they show a material increase. With no very favorable conditions, therefore, to back up the advances it is not surprising that after much irregularity the market should have closed at 44/11 1/2 ton. On the West Coast the hematite market has receded to about 50/. Here the conditions are normal, and there is good reason to believe that the shipments from the district direct to the United States will shortly show a large increase, and possibly stocks will be considerably reduced. Shipments from Middlesboro' have been comparatively small, and prices have given way. The assumption, however, is that much that has been sold at the lower rates (about 37/) has been held by weak holders, who went into the market with a view to taking advantage of the recent rise.

Makers are firm in their belief in an upward movement, and will not quote for other than prompt delivery. In Staffordshire buyers have rather held off, in the hope of a reduction, but sellers have given no encouragement, and have reaffirmed their intention to stand at late rates. In the finished-iron departments galvanized iron and black sheets have been very firm, and will probably be better still in the course of a week or two. In bars, wire and nail rods the event of the week has been the advance that has been made in the Belgian and German markets. Fully 5/ more 1/2 ton has been asked, Belgian bars being now quoted at 82/ net. A greater rise has been made on German wire and nail rods. Americans have been buying wire rods both in this country and in Germany, and inquiries for further business are still under consideration. English best bars have not yet advanced. In old rails and scrap there has been a slight lull in the recent rush, but late rates are well maintained. Freight for pig iron by ordinary steamer from Glasgow to New York continues firm at 10/ 1/2 ton. Steel has distinctly enhanced its position, and nearly every department exhibits greater activity. Labor troubles are the chief source of anxiety just now. In blooms business this week has been done at 21, and the demand still continues. Steel rails for the United States are believed to be much inquired for, and there is good reason to believe that large purchases have been secretly made. Rumor places the quantity at about 40,000 to 50,000 tons, but it is too uncertain to be relied upon. The New Zealand order mentioned as having been placed in South Wales was given to Bolckow, Vaughan & Co., Limited, at 24/ 6/6, f.o.b. Middlesboro', for a 53-lb section. For a small order of some 2000 tons of about 40-lb section 24/ 12/6 has been obtained, and 10,000 tons have been placed by the Manchester, Sheffield and Lincolnshire Railway Company with Cammell & Co., Limited, at about 24/ 5/ 1/2 ton.

SCOTCH PIG IRON

has been irregular as regards warrants, and values in that respect are now down to about 44/10, as against the 47/6 of about a fortnight ago and 39/10 this date last year. Makers' brands are proportionally easier, in sympathy with warrants and under the influence of the political uneasiness of the time being. There are now 76 furnaces at work in Scotland, compared with 95 a year ago. In Connal's stores there are 841,959 tons—an addition of 588 tons last week—as against 679,716 tons on January 29, 1886. Shipments to date are 6737 tons ahead, while importations of Middlesboro' pig iron into Scotland are 6101 tons ahead of last year's to the same date.

HEMATITE PIG IRON

is fairly steady, but to-day's telegrams quote it a shade lower, although the demand remains good. Warrants are 49/ @ 49/6 and mixed lots 49/6 @ 50/. There are 47 furnaces blowing on the West Coast, against 43 a year ago. Stocks in stores only are 143,187 tons—an increase of 11,094 since Christmas. Pig-iron shipments are 12,405 tons behindhand to date, while rail shipments are 5961 tons ahead to date this year.

THE HARDWARE TRADES.

In London all the Thames street foundry houses are impressed with the stiffening of the prices in iron, a goodly number of them having been notified from the North of a rise from 5% to 7 1/2%. Up to the present the castings trade is conducted as per lists distributed during the past 12 months, but special prices are withdrawn, and as soon as one foundry of standing raises its prices the others will apparently readily follow. One firm already announces that castings other than rainwater goods are advanced not exceeding 10%, which shows that some people are confident that the firmness of the market is of something more than a temporary character. At Birmingham colonial and foreign orders are arriving more freely and the Canadian trade is opening very promisingly. On home account orders are coming to hand pretty briskly from the agricultural districts, but the high price of money is restricting speculative buying. On Government account there is not much doing, except in rifles, but the Admiralty have just placed a new contract for 23 additional sets of torpedo propelling apparatus. For the Indian Government a good contract for iron tubes for telegraph poles has been given out. The rise in iron has already led to some advances in the prices of finished goods, especially builders' fittings and iron-plate goods. Wrought-iron tubes are also dearer, though no general advance has yet been declared, and cut nails cannot be got at the extreme limit of recent quotations. At Sheffield prospects of trade continue to brighten. Tool-makers, as a rule, are doing a little better, which is a decidedly hopeful sign, and cutlers and platers are still actively employed. The heavy trades have had opened to them a prospect of greatly improved business. Trial plates for experiment with steel projectiles ordered by the Government from Cammell & Co. and from John Brown & Co. may be taken as an indication of coming orders in this direction. Inquiries about armor plates are also being made by foreign countries, and the demand for war material generally is active. It is stated that four Sheffield firms are now devoting some attention to the production of steel shells. In this connection it may be noted that the intention of the Spanish Government to spend £9,000,000 on the navy is viewed with considerable interest in Sheffield, as it is hoped that some of the money may go here for armor plates.

TIN PLATES.

In London the market is less firm than it was a week ago, and for the time being American buyers appear to be holding aloof. Most of the works, however, are well off for orders, and they are not disposed to book forward orders below 13/3, f.o.b. Liverpool. Second hand parcels and stock lots have, however, been sold at 13/. At Liverpool the market continues firm, with a strong upward tendency. The prices of the various sorts of tin plates have been advanced all round, and sellers generally are in a very excitable state. Buyers, on the other hand, are taking it rather coolly, considering the higher prices that rule for the



NEW REVERSIBLE GUARD RAZOR

MADE BY THE J. R. TORREY RAZOR CO., Worcester, Mass.
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OF EVERY DESCRIPTION.

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Manufacturers of Cast Shears,
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A SPECIALTY.

Send for Catalogue and Full List.

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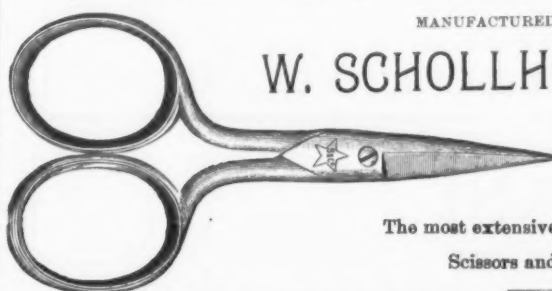
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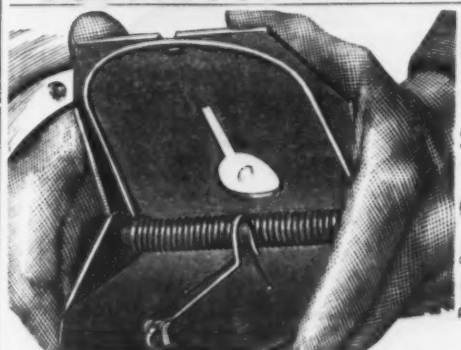
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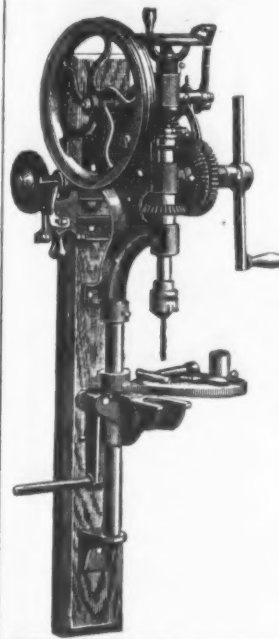
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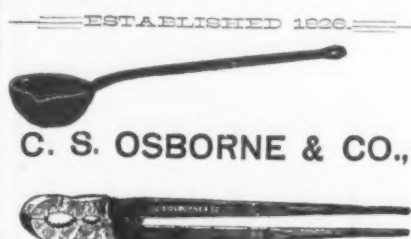
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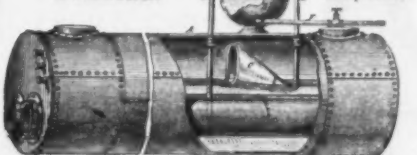
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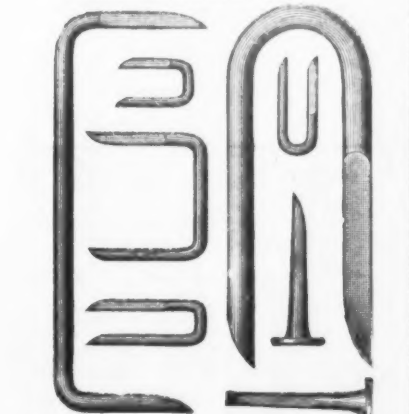
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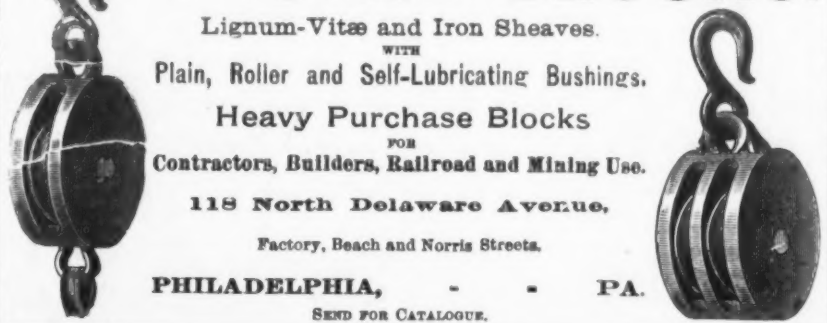
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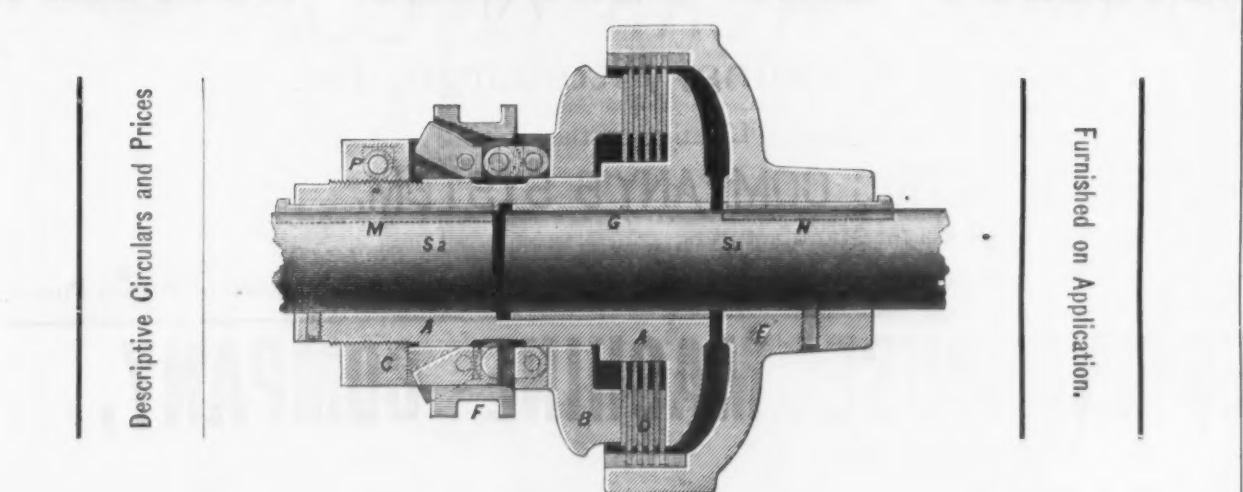


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Made wholly of metal. No wood or leather surfaces. Entirely free from collar friction or end thrust. Runs without noise and without loss of power in driving. Friction surfaces are of flat sheet metal; easily renewed. Adjustments are simple, easily made and positive. Easily applied; the working parts all attached to a central sleeve.

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raw materials. There has been a fair amount of inquiry for certain sorts of tin plates, such as Bessemer-steel cokes, Siemens steel plates with coke finish, also for tin plates and charcoal terne-plates. The number of orders placed, however, is not at all commensurate with the inquiries made. There is a good demand for coke-tin wasters at 12/6 @ 13/. Bessemer-steel cokes and coke-tin plates are now quoted firmly at 13/6 @ 14/ IC; Siemens steel, with coke finish, 14/ @ 14/6; charcoal tins, 15/ @ 17/6 IC; ternes, 13/6 @ 15/6 IC; coke ternes, 12/6 @ 13/.

The Pittsburgh Locomotive Works.

Referring to the Pittsburgh Locomotive Works, a correspondent of *The National Car and Locomotive Builder* writes:

Like all other first-class locomotive builders, these shops are very busy, and are turning out about two engines a week. They have an order of Baltimore and Ohio moguls on hand which gives a large proportion more work than ordinary locomotives of the same class. For the force employed, and, considering the room occupied, these works have the means of turning out a very large quantity of finished work. They have carried the system of employing special tools for duplicating processes with exactness to great perfection. The method so much used in armories, sewing-machine factories, and other places where small metal-work is duplicated by jigs, peculiarly shaped milling cutters and other special appliances, is here extended to heavy locomotive-work with the most satisfactory results. There is scarcely a small form or piece used in machinery that eastern shops do not produce milling cutters for finishing without handwork, and it seems that only a little ingenuity is necessary to apply the same system to the large forms of locomotive details. This appears also to have been the opinion of Mr. D. A. Wightman, superintendent of these works, and he is applying milling more extensively than anything I have hitherto seen on heavy material. The leading obstacle to applying milling machines economically to heavy work has been the difficulty of making and keeping in order the large cutters required, for the heavy steel tool is apt to crack or become distorted in hardening. This source of expense and annoyance is prevented here by the use of milling tools having inserted teeth, and there is no operation found too heavy for the application of the milling cutter. A great deal of the cylinder finishing, rod work, fitting of axle boxes, shoes, link-work, strap rod ends, &c., is done on the milling machines, and is reported to be more cheaply and accurately performed than anything done by a first-class hand on a planer. In the case of rod brasses, for instance, the bottom, sides and ends of flanges are surfaced at one cut ready for the strap at half the cost of labor that the same work incurs on a planer.

The gauge and template system is very highly developed here. When an order is received for a group of locomotives that are not the standard of the works, the first procedure is to make templates with hardened bushings to fit the parts. This is an expensive operation, but it pays in labor-saving and in the improved character of the work produced. Under this system all work is produced of an exact size, not that it may fit some particular place. When a lathe-man is turning a crank-pin he does not know anything about what wheel it is going into. He fits it to an accurately bored bush, and the man who bores the hub uses a plug gauge a certain size larger than the bush, so every pin and every pin hole in all engines of the same class agree in making a driving fit. All smaller fittings are got out on the same plan, the parts are finished on a manufacturing basis. Our English friends who prate about the inaccurate fitting of American locomotive work ought to work in a shop of this kind for a year to teach them something about fitting on a sensible basis. The hardened bushings used are movable and are attached to a handle. When a machinist is drilling the holes in a cylinder head, for instance, the template is clamped to the head and the hardened bush is moved from one socket to the other as the drill gets through. When the bush begins to wear on the inside where the drill keeps rubbing it so that it is not true enough for the original hole it is ground out to the next size, so that before a bush is worn out it does service in a variety of sizes. These works have abandoned the practice of coring holes in cylinder heads and other castings.

The ground where the shops are located is in the form of a rectangle, and the buildings are arranged in a way that reduces the handling of material to the smallest limit. The machine shop and offices occupy the whole front on the main street. There is a transfer track outside the machine-shop, and at right angles to this, the blacksmith shop and other buildings stand, an arrangement which enables all heavy material to be transferred on flat cars. Cranes are provided all over the works for lifting heavy articles, so that nearly every operation in handling material is facilitated by power. The heavy tools in the machine shop are nearly all located close to the side traversed by the transfer table, and convenient to the blacksmith shop and foundry, so that heavy articles, such as cylinders, driving wheels, frames and the like, have not to be conveyed through the body of the shop. As far as possible the machines are arranged in rows, with clear space between them, and tools devoted to the same kind of work are grouped together. One room contains all the machines working on bolts and screws, while another is devoted exclusively to brass-working tools. Compared with other shops the conspicuous feature about these works is the number and variety of milling machines in use, but the supply of the most approved metal tools of other kinds is good. Among those noted were several double-headed shaping machines, four-headed planers, multi-headed drill presses, heavy wheel lathes, boring mills, quartering machines and numerous turret lathes.

The natural gas, which is the crowning glory of Pittsburgh and the pride of every citizen, is extensively used in these works for heating and metallurgical operations. A

10-inch pipe for conveying the gas is carried through the shops on the outside under the roof eaves. Great attention is paid to promoting the comfort of the workmen, very convenient washing and bath rooms being provided with hot and cold water. Payment on the basis of results is followed in nearly all the mechanical operations. The men appear to be well satisfied with the piece-work system.

Foreign Markets.

FRANCE.

PARIS, February 4, 1887.—*Metals*.—Have been quiet at an advance in Tin, a decline in Copper and Lead and sustained prices for Spelter. We quote at the close in francs per 100 kg.: Copper, Chili Bars, 100 @ 102.50; Ingots and Slabs, 107.50; Best selected, 110, and pure Corocoro Ore, 103.75; Tin, Banca, 275; Hilltop, 273.75; Straits, 270, and English, 271; Lead, 32.50 @ 33.25, and Spelter, 38.75 @ 39.25. *Iron*.—There is at length a general upward movement in the French iron markets; here we are firm at 11.50 francs per 100 kg. Merchant, and 14 Flooring Iron. Old Rails have advanced to 9 francs. The North reports favorably. Lille quotes Merchant, 13; Sheets, 15.50 @ 18.30; Horseshoes, 19.30; Chains, 23, and Axles 30 francs per 100 kg. At Valenciennes the rolling mills are booked to the full extent of their capacity. Work is actively being pushed in that locality to furnish iron for the 1889 exhibition buildings. Orders are plentiful in the Ardennes in every branch of the iron trade. This may also be said of the Haute-Marne. Army orders abound at St. Etienne. —*Moniteur des Intérêts Matériels*

BELGIUM.

BRUSSELS, February 4, 1887.—*Iron*.—There has been no abatement in the receipt of orders, so that all works are now fully booked, and, in view of the advance in Pig Iron, Merchant has been raised 50 centimes per 100 kg. for home use, whereas the price for export has not been advanced, as we cannot afford losing export business. Thus, the price for home use is 11 francs per 100 kg., and for export it remains 10 francs; even these figures are out of proportion low compared with Luxembourg Pig, which has to be paid 4.30 francs delivered in Belgium. The Domestic Iron demand is satisfactory; it is less so for export, the orders promised from Roumania and Buenos Ayres not yet having arrived. Structural-iron makers may find it difficult to sell should the price for the same be raised. Taken as a whole, it may be good policy not to push prices overmuch at this time of the year, when the spring demand has not yet appeared. —*Moniteur Industriel*

GERMANY.

HAMBURG, February 4, 1887.—*Iron*.—The improvement in the Rhenish-Westphalian iron market has made some further progress during the week. There seems to be confidence in the future on all hands so that the advances asked have been submitted to without hesitation, and now makers decline selling except for speedy delivery. The advance in Iron Ore in Spain has helped the market in the Siegen district likewise somewhat; Pig Iron of all sorts has been steadily advancing in consequence. There is a continued lively demand for Spiegel, especially for export. Forge Pig is also in good position; sales have been made thereof all the way to August 1 next. Foundry Pig has outrun syndicate figures. Thomas and Bessemer have chimed in with the upward movement. Merchant Iron sold at 110 marks per ton. Sheets are as yet less favorably situated than the rest. The demand is not important enough to admit of an improvement equal to the higher raw material. Meanwhile the price of 140 marks has been fixed by the syndicate. Wire Rods have not advanced precipitately, but gradually, which is probably all the better, the improvement thus being sounder. All the Wire works are very busy. Billets are wanted at rising prices. There is no change in Steel Rails, all other railroad material is held higher. The car works, after filling recent orders, are quiet once more. Machine shops and foundries are busy to a moderate extent merely; there are some isolated complaints in those quarters. Rolling mills not having their own furnaces, and thus being compelled to buy their Pig, find the price of Finished Iron not remunerative enough as it stands, considering the advance in Pig they have to subscribe to. As orders abound at the rolling mills, however, a further advance in Finished may soon take place. The Dortmund district produced during the last quarter of 1886 277,211 tons of Pig, against 260,156 the third quarter; Wrought Iron 123,786, against 114,325, and Steel 224,170, against 223,612. *Metals*.—Lead is quiet, and little offered. Copper is steady. We quote the former 13.50 @ 14 marks; Lake Copper, 50 @ 52; Tin, 104 @ 108; Silesian Spelter, spot, 14.80 @ 15.20; futures 14.30 @ 15.—*Börsenhalles*

BRAZIL.

PARA, January 4, 1887.—*India Rubber*.—The rains in the interior of the province having set in earlier than usual, India Rubber has been firm and tending upward, the crop having very early come to a termination. We quote fine 2.500 reis, and coarse 1.650. Exchange on London, 90 days' sight, 23 1/4.—*O Commercial*

HOLLAND.

ROTTERDAM, January 31, 1887.—*Tin*.—Prices obtained at the sale held on the 31st inst. were lower than expected, say 61.125 Banca and 61.875 Billiton. Since then the market has been firm at 61.25 Banca and 61 Billiton on the spot, at which figures sales could easily be made.—*Koch & Vterboom*

SPAIN.

BILBAO, January 22, 1887.—*Iron Ore*.—Our market continues under auspices as favorable as those of the last few weeks, and there is every likelihood that it will remain so for some time longer. Prices are still tending upward, 8/ having been paid for Campañal and more being asked. Ruibar have ranged 7/4 @ 7/6. Freight has also risen slightly, and for Termeuzen 120,000 tons have been fixed at 6/9. Exportation has been in good condition, despite the rains early in the week. Pig Iron is moving off steadily both for export and coastwise. Ore shipment to date 178,092 tons, against 128,166 last year.—*Bilbao Maritime y Comercial*

CHILE.

VALPARAISO, December 17, 1886.—*Copper*.—The notable decline in England has brought our market almost to a standstill, sales being limited to 6620 quintals at \$15.95 @ \$16.30. The inside price equals \$18.50. *Nitrates*.—Our market has been but moderately active. Sales during the fortnight nevertheless sum up some 250,000 quintals, at \$2.75 @ \$2.80, the inside price equating 7.3 1/2 @ cwt. in England. For February-March delivery \$2.55 is asked for 95%. Charters sum up 17,100 tons for Europe and 9400 for the United States. Shipments during the first 11 months:

	1884.	1885.	1886.
To the North of Europe.....	9,814,090	7,717,080	7,018,773
To the Mediterranean.....	180,576	41,939	163,094
To the United States, on the Atlantic.....	1,179,714	827,290	1,313,583
To the United States, on the Pacific.....	41,573	77,713	253,505
Total.....	11,321,933	8,664,018	8,780,695

Coal has been neglected and we quote nominally: Newcastle West Hartley, 23 @ 24; Orrell, 22 1/2; and Australian, 20 1/2. Exchange on London, 90 days' sight, 24 1/4.—*Weber & Co.*

EAST INDIES.

PENANG, December 28, 1886.—*Tin*.—There has been a very firm market, prices improving from \$34.50 to \$34.80. Fortnight's receipts sum up 10,000 piculs, of which Europeans took 7300 and Chinese 2400. Total shipments hence up to the 17th inst. to England, 149,974 piculs; to the Continent, 2750, and to the United States, 46,268. Exchange, four months' bank bills, 3/1 1/4 d.—*Schmidt, Rasmann & Co.*

COLOMBO, Ceylon, December 30, 1886.—*Flum-bago*.—Has been steady at ensuing quotations in rupees per ton: Large Lumps, 125 @ 155; Ordinary Lumps, 125 @ 140; Chips, 75 @ 90, and Dust, 40 @ 60. Shipments since October 11: 31,171 cwt. to England; 756 to Antwerp; 24 to India, and 42,808 to the United States; together \$1,400, against \$3,875 in 1885, \$3,915 in 1884, and \$9,542 in 1883. Exchange, 1/6 1/2-16.—*Volkart Brothers*

H. D. SMITH & CO.,

Plantville, Conn.,

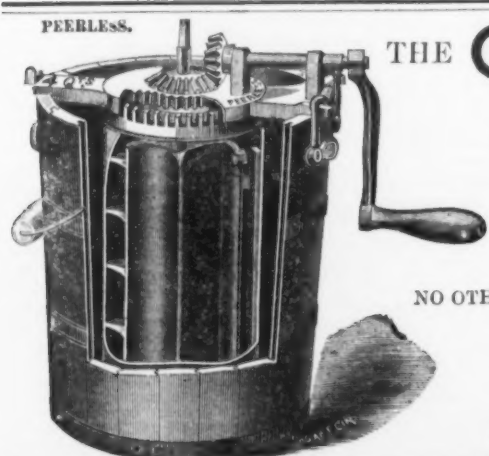
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Manufacture the Largest Variety of Forged Carriage Irons, of Best Material and Workmanship.

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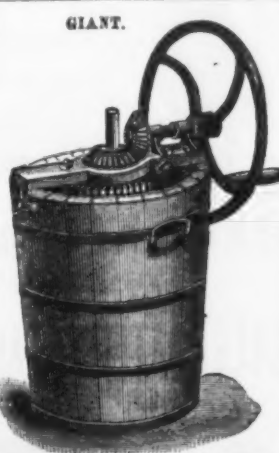
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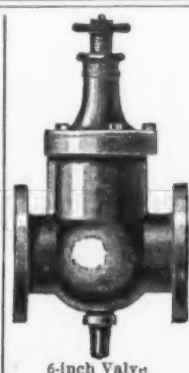
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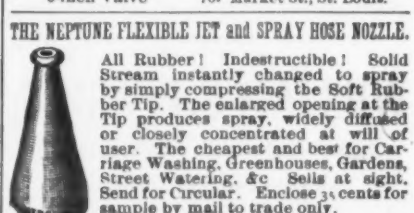


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CURTIS
Pressure Regulator,
FOR
STEAM and WATER
is made entirely of metal; occupies the same space as a globe valve. It has no glands or packing, and is a lock-up valve. Write for circular. Manufactured by Curtis Regulator Co., 61 Beverly St., Boston, Mass.

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All Rubber! Indestructible! Solid Stream instantly changed to spray by simply compressing the Soft Rubber Tip. The enlarged opening at the Tip produces spray, widely diffused or closely concentrated at will of user. The cheapest and best for Carriage Washing, Greenhouses, Gardens, Street Watering, &c. Sells at sight. Send for Circular. Enclose 3 cents for sample by mail to trade only.

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Capital investing for dividends will do well to close no contracts till our proposals are considered.

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WESTINGHOUSE, CHURCH, KERR & CO.,

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Engineers and Contractors for Central Stations for Incandescent Lighting on the

WESTINGHOUSE ELECTRIC COMPANY'S SYSTEM.

Isolated Incandescent Plants, Steam Power Plants for Manufacturers,

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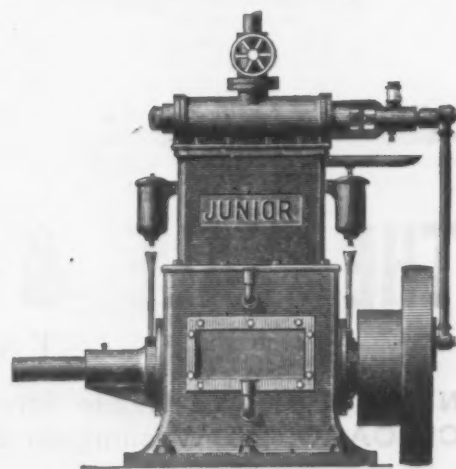
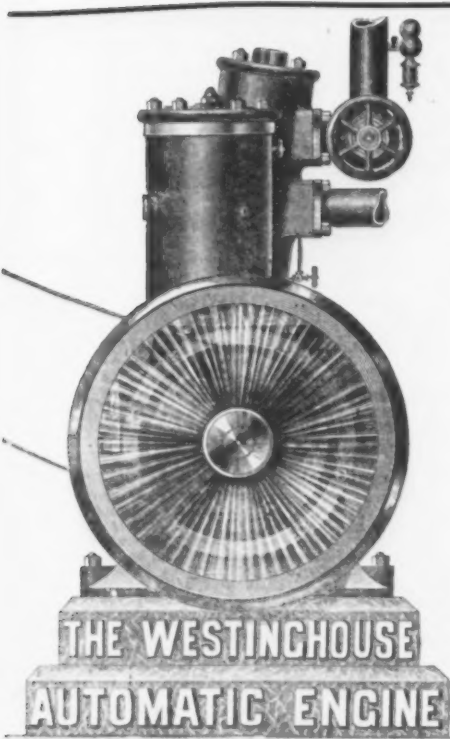
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TEAL'S
Portable Hoist,
Patented, April 8, 1884.
Advantages claimed.
1st. Being made with
Spur-Gears and at
the same time sus-
taining the load as
any point.
2d. One man of ordi-
nary strength is ca-
pable of raising a
load for which each
hoist is built.
3d. The ability of rap-
idly raising or
lowering the empty
hook by pulling on
the lift-chain, in-
stead of the slow and
tedious process by
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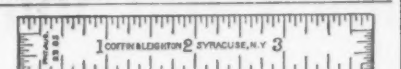
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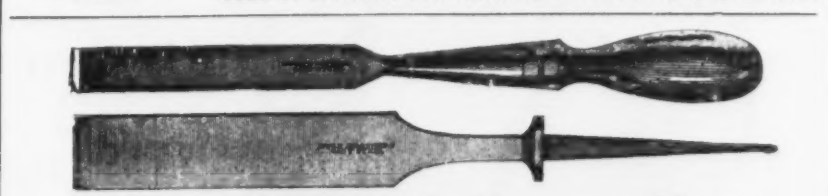
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THE WEEK.

Fires along the river front are of late more frequent, endangering both shipping and merchandise. The latest occurred on Saturday night at the Morgan steamship pier, where flames broke out from a bottle of phosphorus, to which a fuse was attached, but the policemen drowned out the fire with a few pails of water. The cause of the fire on the Cromwell pier has not yet been ascertained, nor has any arrest followed the offer of a reward for the authors of the dynamite explosion on the Old Dominion steamer.

Figuring up the net costs of the strikes in New York, which are now believed to be near their end, the results afford little inducement for their repetition. According to Bradstreet's, the total losses in wages to the longshoremen and other working people in New York and New Jersey, from January 1 to February 10, are estimated at \$2,650,000, while the estimated loss of wages by 38,000 employees thrown out of work through scarcity of coal or because of strikes of others is \$350,000. Other losses growing out of the strikes are estimated as follows: Total extra amount paid for coal through strikes, \$700,000; total losses incurred by steamship companies through delays, \$100,000; total losses to coal shippers, \$100,000; total estimated losses of the export trade of New York in two weeks, \$3,380,000.

Manufacturers think that, while the proposed appropriation of \$1,000,000 for the construction of two steel rams may not be sufficient, it is a good beginning.

The salmon pack on the Pacific Coast for the year 1886 amounted to 933,354 cases. The shipments to Eastern States and Canada were 93,000 cases greater than in 1885.

Contracts for 6,000,000 pounds of canned beef, put up in canteens for army use, are said to have been taken by Chicago packers.

The possible effects of a war in Europe are the subject of speculation by the London Economist, which says: "It is probable that the trade of this country would ultimately lose rather than gain by war, but the loss would scarcely be serious, and would certainly not justify more than a very moderate shrinkage in the prices of home securities. In the case of America the position is different, for not only is that country completely removed from all fear of disturbance, but many of her important products, such as preserved meat, &c., would come into greatly increased demand, which would probably impart an added stimulus to the whole of her trade. It is difficult, in fact, to see how the United States could possibly lose in the event of European complications."

Tennessee marble is far-famed. In Knox County alone there are 30 quarries. New York has had large quantities of marble from Tennessee, as may be seen in the Mills Building on Broad street, or in the new Equitable Building, and one of the iron masters of Pittsburg, who is building for himself a palace home, has just given an order to a Knoxville firm for 24,000 cubic feet of the variegated slabs out of which to make interior decorations. The one drawback is the lack of cars with which to get the material to market. Hundreds of loads of finest marble lie awaiting cars along the tracks close to Knoxville. As a rule a royalty of \$1 per ton has to be paid to the owner of the land on which quarries exist; it costs from \$2 to \$3 to quarry, and by the time it is on board the cars it represents \$5 or \$6 and in the market finds ready sale at from \$20 to \$50.

The Prison Labor Reform Commission, appointed to investigate and report by bill or otherwise as to the best method of employing convicts confined in State prisons, penitentiaries, &c., other than by the contract system, presented their report to the New York Legislature. The commission has spent part of eight months in investigation, visiting all the prisons and reformatories in the State, and many of those in other States and in Canada. According to the report the prison population of the State was in December, 1886, 12,855. Of this number there were idle on January 1, 1887, at Auburn, 297; at the Erie penitentiary, 300. The contracts to expire this year are: At Sing Sing, February 28, 760 now on stove contract, and, on August 31, 300 now on shoe contract. After thoroughly discussing the question in all its phases, the commission submit an act establishing a State or public account system in the State prisons and reformatories and a county account system in county penitentiaries.

The 2000 employees of Bolckow, Vaughan & Co., ironmasters and steel manufacturers, of Middleboro'-on-Tees, who on January 28 struck work, have, with a few exceptions, agreed to return to work at their former wages.

The largest gun yet made was tested at Woolwich Arsenal last week. It is called the one-hundred-and-eleven-tonner, is 44 feet long, and its maximum service charge of powder is 900 pounds. It is to be mounted on a recently launched British ironclad, the Benbow. The total weight of the gun and platform is 225 tons, and the projectile is a frightful mass of iron, weighing 1800 pounds, which will pierce 33 inches of armor at the mile range. Heretofore the largest guns made have been those on the Italian ironclads furnished by the

Krupps, their weight being 105 tons each. But the Krupps are now making for the Italian land service a gun even larger than the one to be mounted on the Benbow, as it is to be of 110 tons weight.

The following is a list of the co-operative societies doing business in Ohio up to the present time: The Straitsville Co-operative Coal Company; the Geneva Mercantile Company; the Sunday Creek Co-operative Company; the Potters' Co-operative Company; the Wooster Co-operative Foundry Company; the Corning Co-operative Society, Limited; the Co-operative Nail Company; the Kent Co-operative Store Association; the Sumner Glass Company; the Ohio Valley Co-operative Pottery; the Standard Co-operative Pottery Company; the Assemblies Soap Company; the K. of L. Co-operative Company, Limited; the Wadsworth Co-operative Company; the K. of L. Co-operative Distributing Association; the New Pittsburg Coal Company, and the Cincinnati Co-operative Cigar Company.

Consul-General Waller, of London, has made a report to the Department of State in regard to the consular service in the United Kingdom, from which it appears that there are now in that service 116 men, of which number 34 are Americans and 82 are Englishmen. Mr. Waller says that the reason so small a proportion of the consular places in Great Britain is held by Americans undoubtedly is that the compensation such places now offer is entirely too small to induce competent Americans to leave their country and enter the service. The nationality of the consular force, he says, could in a short time be changed in favor of our country by increased appropriations and allowances for consular clerk hire, or by the organization of a corps of commissioned clerks with adequate salaries, and with the right of promotion based on experience and merit.

The Secretary of the Navy on Monday issued a circular to about 50 steel manufacturers of the United States, giving full and explicit information as to the requirements of the department in the way of armor plates and heavy gun forgings in the prosecution of work authorized by Congress on the monitors Puritan, Amphitrite, Monadnock and Terror, and for work on the two naval cruisers. The time fixed for receiving proposals for the forgings and plates has been extended to March 15 next.

Pittsburgh papers notice a sale of 5000 acres of Coal lands in the Monongahela Valley to New York and Philadelphia capitalists for \$250,000. Twenty years ago Coal was bought in the same field at \$100 per acre, which in this deal goes for \$50, showing the depression in the coal business of the valley under the combined influence of competition by natural gas and the lockage tolls.

A cable for Third avenue has been fully decided upon by the railroad company as a substitute for horse-power. The cable system, according to the tests made on the experimental line in Tenth avenue, will be about 40 per cent. cheaper, thus allowing for a first class equipment. In about a year the whole line will be in operation, and, in the opinion of President Lyons, will prove to be the pioneer in a new departure for this city.

Bids were opened at the Navy Department on Tuesday for the purchase of 400,000 pounds of bronze stored at the Navy Yards at Boston, Norfolk and Washington. Contracts were made with the lowest bidders as follows: Thomas Butler & Co., of Boston, for the material at the Boston yard at 8 1/4 cents per pound; M. Lissberger, of New York, for the material at the Washington and Norfolk yards at 8.15 cents and 8.13 cents per pound, respectively.

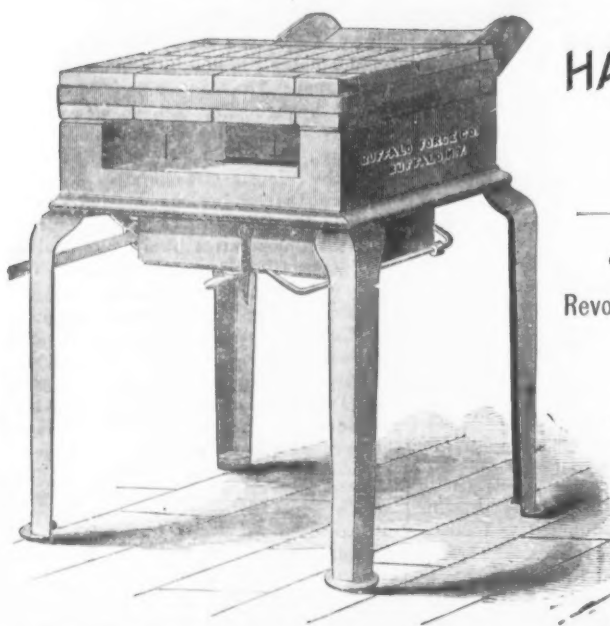
The Clyde Steamship Company are building an automatic apparatus for handling coal by machinery, which will do away with the services of many men and obviate further embarrassment from possible future strikes. The new machine is said to be expeditious and effectual in operation.

The Board of Army Engineers appointed to report upon the construction of the Arthur Kill Bridge have recommended an entirely different structure from that specifically described in the act of Congress, so that further Congressional action is awaited.

The Alexandria (Virginia) Gazette says: "The Arrow Steamship Company, of New York, have signed the contract for the purchase of the Alexandria Marine Railway and Shipbuilding Company's yard, and will at once commence the construction thereof of a mammoth iron steamship, for which a patent has recently been granted." The advantages claimed for Pocahontas—the first boat of the new type—are great structural strength, high speed and luxurious quarters for passengers. She is to be employed purely as an express steamer, an average speed of 21 knots upon 150 tons of coal and with 10,000 developed horse-power being promised.

Water-tight compartments proved a delusion in the case of the steamer Wells City, from Bristol and Swansea with a cargo of tin plates, which was sunk in the North River a week ago. She was swept from her anchorage by an ice floe, and coming in contact with the Lone Star, also at anchor,

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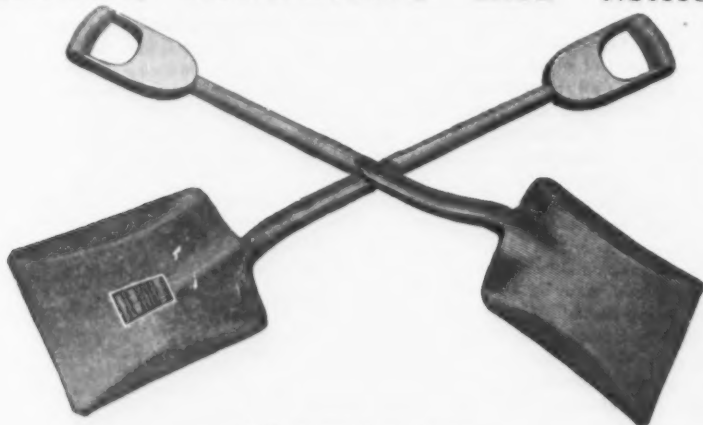
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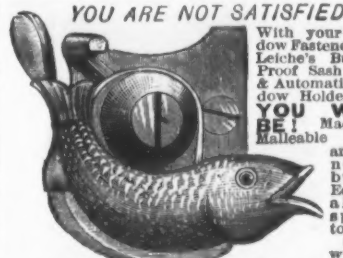
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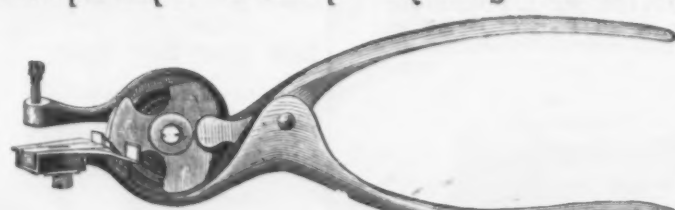
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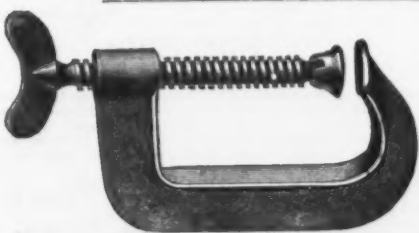
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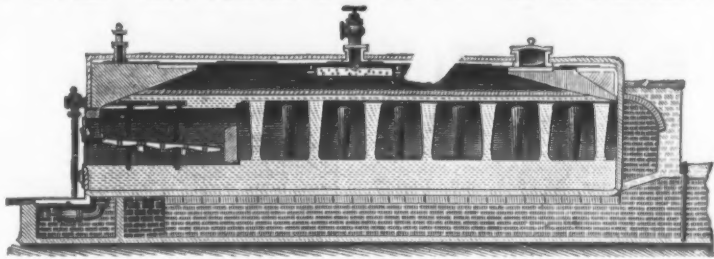
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was cut through near the center and went down. The compartment doors are supposed to have been left open. Her cargo of about 24,000 boxes of tin plates will be badly damaged, but will be removed with the aid of divers. After this is done preparations will be made for raising the vessel.

The annual election of the American Institute resulted in the success of the regular ticket, Thomas Rutter, president.

Thousands of cattle have perished from starvation and cold this winter on the Western cattle ranges. In Montana the feeding grounds are deep under the snow, while, according to Canadian authority, no losses have occurred in the Dominion. The principal difficulty is said to be overstocking, which causes the pastures to run out.

Lumbering is very active in the timber lands of the Northwest.

A large, new dock, 150 feet wide, on the East River front, extending continuously from Sixty-fourth to Eighty-sixth street, is represented by the Real Estate Owners' and Builders' Association, of this city, to be a much-needed improvement.

The final report to the Agricultural Department indicates a cotton crop of about 6,400,000 bales, of which 85.1 per cent. had been marketed February 1.

In the New York Assembly a bill offered by Mr. Graham, of Brooklyn, was designed to compel street railway companies to employ none but licensed drivers, which would prevent drivers' places being filled by "scabs" in case of a tie-up. The bill was killed by a vote of 47 yeas to 60 nays.

The steamer New York, for the Albany day line, is 300 feet long, 40 beam, 12.3 depth of hold. She was built by the Harlan & Hollingsworth Company, and is receiving her machinery.

Lieutenant Very, U. S. N., is deputed to supervise the manufacture of steel at the mills of Park Bros. & Co., Carnegie, Phipps & Co., and the Linden Steel Company, at Pittsburgh, to be shaped for the structural parts of the new cruisers. The steel shafting to be made for the new cruisers in England and at Essen will also require naval inspection.

There is a great deal of money to be made by trading with South America, in the opinion of the British Consul at Maracaibo, who has had an experience of 10 years in that country. He is especially enamored of Venezuela, where everything is sold "from a hair pin up to a locomotive," but competent men are needed to work up the trade. A knowledge of the Spanish and Portuguese languages is indispensable to success.

The Philadelphia City Hall, now in course of construction, affords a parallel to the famous court-house job in New York. The original estimates of cost amounted to about \$12,000,000, nearly all of which has been expended, and yet, according to the chairman of the committee in charge, "it will take the butt end of \$20,000,000 to finish and furnish this building." The propriety of adding about 1000 tons of metal of various kinds to bring the city-hall tower to the height of 535 feet is under discussion.

A paper mill in Maine is running on an order from Scotland.

The total imports of paper stock at this port in January comprised 23,236 bales, of which more than one-half were manila, as against 34,486 bales for the same month last year and 40,510 bales in January, 1885.

The Consul-General of the United States at Melbourne, in a dispatch to the Department of State concerning the Jubilee International Exhibition at Adelaide, says: "American machinery of all kinds, if represented by able men, will meet with success, especially machinery for the reduction of refractory ores of all kinds, irrigation machines, ditching machines, what is called V. scraping machines, Acme and other mowing machines with arrangements for stacking hay, straw, &c."

Since the last railway holocaust, steel railway cars are strongly advocated in some quarters, and new devices for heating are without number.

Sugar planters near New Orleans have decided to diversify their crop by planting corn and vegetables until sugar becomes more profitable. Corn, by successive plantings, ripens from May to September.

Apropos of strikes, Vice-President Le Grand B. Cannon, of the Delaware and Hudson Canal Company, who has been the foremost barrier to the demands of the coal-handlers, said in his testimony before the Assembly's committee on Saturday: "I am an advocate of high wages, and I believe it possible to reconcile the capitalist and the laborer to each other by adopting a system that will appeal to the laboring man's personal ambitions. My plan is to increase a man's wages per diem as he serves years faithfully in the company, and make promotions to the highest positions from the rank and file—in other words, it is a profit-sharing scheme. I have put it in practice in a steamboat company on Lake Champlain, and the men who are captains and mates on the boats there now came into the company's employ in the lowest positions. Of course, I contend that this line of promotion and method of increasing pay should

depend upon continuous good conduct and service. And when the man has served the company many years and become incapacitated, I believe that he should be retired on a pension. I speak of this plan now because these union organizations are pushing labor and capital further apart."

The annual report of the Emigration Commissioners submitted to the Legislature shows that during the year 1886 there arrived at this port 321,814 aliens and 57,723 citizens, making a total of 379,537. Alien immigration increased 30,748 over that of 1885. Of the aliens arriving last year 180,478 were adult males, 85,368 adult females and 55,668 children under 12 years of age. After New York, Pennsylvania received the largest number of immigrants, Illinois ranking next, with 25,500.

Assistant Secretary of State Porter has transmitted to Superintendent Houghton, of the Maritime Exchange here, a number of dispatches from our consul at San Juan, P. R., and consul-general at Havana, showing the tonnage dues that are now paid by Spanish vessels in Cuban ports, together with the official regulations and prescriptions pertaining thereto.

Careful estimates made by Chicago engineering experts indicate that a channel capable of carrying 540,000 cubic feet of water per minute can be cut through the limestone uplift in the Desplaine River bed at a cost of \$3,000,000. The other work proposed and projected by Engineer Hering and Mayor Harrison can be completed and perfected at a cost of \$5,000,000. But the Chicago Tribune is of opinion that "it has yet to be shown that there is any real necessity for the costly proposed canal to divert the waters of the Desplaine into the lakes near Bowmanville. The figures of the so-called Drainage Commission place the cost of the system at \$24,000,000."

Four railroad corporations have united in an agreement to build a steel bridge across the Sault Ste. Marie River, in Michigan, to cost \$560,000, and the work will be completed this year. The general manager of the Canadian Pacific was authorized to procure the material and go to work.

The Pacific Mail Steamship Company and the Panama Railroad Company have settled all differences. In lieu of monthly payments of \$70,000 for transportation across the Isthmus heretofore charged, the Pacific Mail will pay \$55,000 per month, and the company are allowed to reduce their service in any way it chooses, instead of being compelled to run one steamer every week, as was provided under the terms of the old contract.

Lieutenant Zalinsky produced before the House Committee on Naval Affairs, plans for torpedo rams between 3000 and 4000 tons burden, carrying pneumatic guns of 18-inch caliber, capable of discharging projectiles containing 1000 pounds of explosive gelatine. The vessels are also designed to carry a full complement of mere machine guns and are to be armored heavy enough to resist any machine gun discharge. A speed of 17 knots or about 20 miles an hour is contemplated. The dynamite cruiser now under contract will be 230 feet in length, 26 in breadth and 72 feet in depth. She is guaranteed a speed of 20 knots per hour.

The contract for building the new United States lighthouse steamer Zizania has been awarded to Ramsay & Co., of Baltimore. The above firm will also furnish new boilers for the lighthouse steamer Wisteria.

The Buffalo water commissioners ask for authority to contract for a new 20,000,000-gallon pumping engine.

Secretary Whitney is now considering the report of the board on the completion of the monitors. He finds it difficult to take action owing to the discoveries made by the board. They found many defects in the construction of all three monitors, but notably so in the case of the Puritan. Upon an examination it was discovered that the machinery of the Puritan was 200 tons in excess of the weight she could safely carry. The changes and alterations which will be necessary to put the monitors in a serviceable condition will require so large an expenditure of money that it is doubtful whether it will be found expedient to complete them.

The New York Board of Trade and Transportation passed resolutions asserting that the necessity of arming the seacoast is imperative, and suggesting that the old stock of cast iron now on hand should be converted into smooth-bore and rifled cannon. On the same day this action was taken the Senate bill to encourage the manufacture of steel for modern naval ordnance and other naval purposes, and to provide heavy ordnance adapted to modern naval warfare, was presented in the House of Representatives in Washington, and referred to the Committee on Appropriations, where it is likely to remain.

The official list of German vessels for 1887 gives the strength of the Empire on the seas. It places the number of vessels at 100 against 98 last year, classified as follows: Thirteen ironclads, 14 armored vessels, 9 cruiser frigates, 8 cruiser corvettes, 5 cruisers, 4 gunboats, 5 avisos, 11 schoolships and 31 vessels for other purposes. In addition there are about 150 torpedo boats.

The Iron Age

AND METALLURGICAL REVIEW.

New York, Thursday, February 17, 1887.

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THE IRON AGE INDEX.

The Index to Vol. XXXVIII, July to
December, 1886, is now ready, and will be
sent to subscribers on application.

Striking "In Sympathy."

The strikes which have for weeks un-
settled business in the greatest com-
mercial center of the country furnish an ex-
cellent example of the futility of all efforts to
force an issue by causing large bodies of
men to strike "in sympathy" with mem-
bers of the same organization engaged in a
contest with employers in another trade.
At no time have those in charge of the in-
terests of the Knights of Labor attempted
to carry out in so sweeping a manner the
doctrine that the best means of gaining a
contest was to enlarge it—to convert a local
skirmish into a pitched battle. They have
virtually taken the position that unless dif-
ferences between a few hundred men and
their employer be settled to suit their views
of the case, then the great commerce of
New York must be stopped, if they can do
it, and a population of 2,000,000 be de-
prived of domestic comforts during a rig-
orous season. At first they ordered out
the coal-handlers, then, "in sympathy"
with the latter, the longshoremen, who had
no grievance, and finally the members of
great trades, like the brewers, on the ground
that their work was tainted by the use of
"scab coal." In other words, they have
taken the position that it is the duty of
members of their organization to help others
in trouble by increasing the embarrassment
of recalcitrant employers at any cost to
themselves or at any inconvenience or dam-
age to business interests or to the community
at large. Consistently carried out this
principle would involve the putting under
ban of every interest which might, even
remotely, have any connection with the par-
ticular line of business against which a
contest, however trivial, might happen to
be waging. It will be readily understood
that this method of coercion would place

the entire industries and commerce of the
country at the mercy of the obstinacy of
the contestants in some petty difference.
No man would be able to tell whether he
was to be allowed to produce, handle, or
consume any article of merchandise from
one day to the next, simply because the
Knights of Labor might see fit to condemn
it through sympathy with a strike affecting
something entirely different. It does not
require much imagination to foresee that a
condition of affairs bordering on anarchy
would soon result if such principles could
possibly prevail.

It is reassuring to note that in practice the
effort has proved a lamentable failure. The
embargo on coal has hurt those most who
could least afford it, and who, generally
speaking, sympathize with the strikers. The
longshoremen have been severely punished
by the loss of their places, and the necessity
of looking about for other employment, with
all its uncertainties, is not conducive to a
high regard for the capacity of the officers
whom they obeyed. The brewers have flatly
refused to do the bidding of the heads of the
Knights of Labor and will surrender their
charter. It has been clearly shown that,
however fine in theory the idea of extending
strikes by ordering out others in sympathy
may be, it is sadly deficient in practice. The
members of trade organizations generally
are imbued with a loyalty to their cause that
will bear many sacrifices. But belief in the
justice of a cause is one thing and confidence
in the ability of those who are guiding its
fortunes is quite another. The history of
labor organizations has shown again and
again how quickly the men will repudiate
leaders who have failed to achieve success,
irrespective of the merits of the case en-
trusted to their generalship. The defeat of
the Knights of Labor is due to the fact that
there is always a great army of unemployed
who will take some risks even to secure
work abandoned by union men. This is
particularly true of unskilled labor, of
which even in prosperous times there is al-
ways a surplus. Any efforts to create a
complete stoppage of any great business de-
pending chiefly for its continuance upon
men needing no special skill must meet with
failure, provided employers and non-union
men are given the protection which they
have the right to claim. This, we take it, is
the great lesson which the last strike has
taught, but it is to be feared that its teach-
ings will be lost upon the men who con-
trol the Knights of Labor district assemblies.
They have acted in direct opposition to the
teachings and professions of its head, who
has once more shown his inability to shape
the course of his subordinates in such a way
as to prevent a loss of prestige both in pub-
lic opinion and in the estimation of many
members in the ranks.

Interdependence of Different Branches in the Iron Trade.

Though readily foreseen by any one who
has intelligently watched the course of
events in the iron trade during the past few
years, little emphasis has been placed upon
the natural outgrowth of the movement
alluded to—viz., the increasing interde-
pendence of its different branches. Gen-
erally speaking, it may be stated that the
producers have keenly realized this, but
we have reason to believe that the buyers,
and particularly the small buyers, have
not sufficiently awakened to the fact. It is
to them notably that we desire to address
ourselves. Only a few years since the entire
product of Bessemer steel practically was
devoted exclusively to the manufacture of
rails. Only indirectly such articles like nails,
wire, bars, plates, sheet, tin plates, &c., were
affected by the movements in that industry,
through the possible influences which a slack or
a lively demand for raw materials might exert.
Now, to a great extent, and still more in the
near future, the raw material for these indus-
tries comes from the same source. In other
words, formerly the pig iron and old material
used for the manufacture of the many articles
which are ultimately placed in the hands of
consumers by small distributors was one grade,
while the pig iron serving as the basis of the
making of rails was quite a different grade.
Now the foundation of a great part of the nail,
wire, tin plate and cognate industries is the
same, leaving out of consideration for the present
the Clapp-Griffiths process, which plays a
comparatively unimportant part as yet, and the
basic process, which is not yet in regularly
successful operation on a large scale in this
country. Both of them rely upon a compara-
tively lower grade of raw material. This ap-
plies to those articles which are chiefly of
domestic production. In those which are
partly or wholly controlled by foreign pro-
ducers the matter is somewhat different.

In detail we need only refer to the recent
developments in the nail trade. Figures for
1886 showing what gain steel nails have
made are not yet available, but no one who has
had any interest in the article can have
failed to note the advance of the steel nail.
In plates and sheets progress has been in
the same direction, though not in so pro-
nounced a manner. In bars comparatively
little has been done in the displacement of iron
by steel. In wire, however, only a small
part outside of that used for telegraph pur-
poses is now of iron. The enormous quantity
used annually for fencing purposes is made
almost exclusively of steel. It is here that

the basic process plays the most important
part so far as we are concerned. The raw
material for the greater part of the wire
rods imported into this country from Ger-
many is basic steel. In tin plates, the
Welsh works have swung over more and
more to Bessemer and open-hearth plates.

Leaving aside imported material for the
present, it will be readily understood that
this change from iron to steel brings new
elements into the situation, so far as the
small buyer and distributor is concerned.
The supply of ore for making Bessemer
steel is limited to a comparatively few local-
ities, and the importance of a local industry
from ore to finished product is growing less.
The other trades are more keenly affected
by movements in the rail market, which is
the heaviest single interest. Formerly great
activity in railroad building affected nails,
wire, tin plates, &c., chiefly by indicating a
heavy consumption in other lines. Its influ-
ence upon prices by increasing the cost of
raw materials was comparatively remote.
Now its effect is more direct. It means that
from the ore to the crude steel the very
raw material which forms the basis of the
manufacture of the goods mentioned grows
dearer. An advance or a decline in rails
has more significance by far now than it
did five years ago for the general iron trade.
It is the leader in more ways than one, and
developments in that particular trade
should therefore be watched with special
care. Rails are bought further ahead than
any article on the list, and in far greater
quantities. The market to-day deals largely
with the question of supply and demand for
the last four months of the current year,
and for that reason reflects conditions far
in advance of those touching other depart-
ments. Of course we do not wish to be
understood to say that the influences spe-
cially affecting every particular line have lost
any of their significance. Prosperity or dull-
ness in the building trades will continue to
be the leading factor telling on nails, and
will affect tin plates, which are, besides,
dependent on other industries. Good crops
and high prices for cereals will determine
the demand for fencing wire. But, so far
as cost of production tells on prices, the
change from iron to steel introduces new
elements, the leading one of which is the
greater mutual dependence of the different
branches of the trade.

There is another factor which will come
into play and that is the centralization of
the business both as to locality and the mag-
nitude of individual works. The unit of
product is greater in proportion to the out-
put of a puddling furnace, to a Bessemer
converter or open-hearth furnace. Coupled
with the tendency of manufacturers to pro-
duce their own raw material this has al-
ready brought about the concentration of
business in large works. The tendency in
the nail trade is in this direction. In the
wire trade it is working in a somewhat dif-
ferent manner, the larger manufacturers of
barb wire taking up more and more the
work of drawing their own plain wire from
imported rods. The Clapp-Griffiths process
held out some promise of counteracting this
tendency, but it has not as yet fully estab-
lished its status in this respect. In any
case the change to steel means larger works,
larger capital, and larger average individual
output. In some cases a number of manu-
facturers have together erected works for
their aggregate needs, but on the whole the
ultimate effect will be to put the business
into the hands of a smaller number of large
concerns. Dependence upon the open mar-
ket for supplies of the cruder forms of steel,
upon billets, slabs, &c., is precarious in the
long run, since it is the very business which
steel works are sure to drop first in periods
of great activity. Centralization in localities
is likely to be partly the outgrowth of the
state of affairs just alluded to, but will be
partly due also to the fact that, as al-
ready stated, the sources of supply of suit-
able ores are comparatively limited.

This will be counteracted to some extent
by the introduction of the basic process. It
has already made Germany more independ-
ent of the Spanish ore market, and would
act similarly here so far as Lake Superior is
concerned. But even more than the acid Besse-
mer process it involves a very large outlay
of capital. Experience abroad has taught, too,
that that this process demands a raw mate-
rial, the specifications for which move within
certain limits only. As matters are now
shaping in the iron trade of this country,
and, in fact, the world over, it is the duty
of the seller as well as the buyer to pay
more attention to developments of the steel
trade, and to watch particularly the move-
ments in rails.

Compulsory boiler inspection is just now
attracting attention in England. It has
been decided that all boilers in the United
Kingdom shall be registered by their owners,
and shall be examined at least once a year,
presumably by a Government inspector. It
will be a matter of some interest to note
whether in England the carrying out of a
measure of this kind will be attended by
better results than have been recorded in
this country. Government boiler-inspection
service has here never been remarkable for
a high order of efficiency—in fact, quite the
reverse—and we doubt very much whether
the experience of English boiler owners will
develop anything which will tend to change
the opinion generally held in regard to it.
While compulsory inspection and registry
are highly commendable in themselves, their
advantages, we think, can be secured most

readily by the adoption of some modified
plan similar, for example, to that recently
outlined by Mr. Waugh, chief engineer of
one of the British boiler insurance companies.
Mr. Waugh very sensibly proposes that,
while inspection should be compulsory, each
boiler owner should have liberty to select
any qualified company to inspect his boiler,
and that every company which makes
such inspections should give a certificate of
safety if the boiler is in good condition.
This certificate should be ample to satisfy
the local government inspectors when mak-
ing their visits. The advantages of a plan
of this kind are obvious, and would, in a
great measure, do away with treacherous
certificates of safety which have been and
are still so freely given by the average gov-
ernment official.

Cornell University and the Sibley College of Mechanical Engineering.

Twenty-five years ago there began a very
powerful social movement, the outcome of a
still older and more general change in educa-
tional methods, which gave rise to a system
of educational institutions in the United
States, such as have been seen in no other
country and in no other time. Two hundred
years earlier, the Marquis of Worcester, while
confined in the Tower of London, varied his
studies of the "century" of his inven-
tions, one of which, as is well known, was a
crude form of the steam engine, by the
consideration of that greater matter
which has been the favorite subject of
thought and debate through all the later
centuries among all intelligent men—the
problem of the best education. He, like
Bacon, Milton, Des Cartes and Vaucanson,
asserted that the nation had perpetrated a
continuous folly in attempting to give all
men the same education, forcing every
talent into the same mold as the Indians of
the Pacific flatten the heads of all children
alike. Like our own Emerson, he protested
against giving all men an education of words
only, and of providing for the child who
was to become a mechanic the same educa-
tion as the comrade who was to grow into
the pulpit or to enter at the bar. Worcester,
Bacon, Des Cartes, and many equally intelli-
gent and foresighted philosophers, urged
the wisdom of educating in the light of
probabilities and not of possibilities, giving
the people an education for a people. This
involved the institution of academies where
physical science should have place beside the
so-called science of metaphysics; with pro-
fessors of the arts and of the sciences of
every-day life, as well as professors of lan-
guages and literature, and where such
knowledge could be had as was best fitted
to make men useful to themselves and others
to earn their bread and to gain the neces-
saries and the comforts of life. Thus, what
are now known as technical schools have
been earnestly, persistently and eloquently
urged for 200 years; and yet we in the
United States, 100 years behind European
nations, are just making a beginning.
France, a century ago, Germany a little
later, but now still more thoroughly and
systematically, perhaps, and all other Euro-
pean countries, are giving to their citizens
an education such as they need first of all,
as well as that education of the older times
which becomes desirable as soon as a living
is assured. Hundreds of technical schools
are distributed over Europe; in the United
States they can almost be counted on the
ends of the fingers. There the system has
been in operation a century and has as-
sumed good working shape; here it is just
passing through the tentative stage.

In the United States great reforms often
wait for the people to take them up and
force them on; too often the so-called lead-
ers fail to lead. Such was the case when,
about the time of the breaking out of the
War of the Rebellion, a movement began
among the people in favor of an education
for the people in branches imperatively
needed by the average citizen. Few edu-
cated men who should have been the leaders
and helpers in this reform; few of the
"statesmen" who should have been the ef-
ficient organizers, seem to have had the keen-
ness of view, the patriotism, the interest
and the earnestness in the right to give ef-
fective aid; and to-day some of the most
earnest opponents of the great movement
which is giving new life to the nations are
among these very men. But Justin Morrill
and his co-laborers in this work, meeting
the demands of the people as they take defi-
nite shape and voice, secured the passage, in
1862, while the country was just entering
upon a war that was threatening its very
existence, of a law "for the promotion of
agriculture and the mechanic arts," by the
provisions of which an immense tract of
public land was appropriated to the use of
what are now known as "land grant col-
leges," in which it was explicitly provided
that "leading objects," the fundamental
purposes, should be the instruction of students
desiring special knowledge in the studies re-
lated to agriculture and the mechanic arts. The
old colleges and the old education was to the
average citizen what sweetmeats are to the
invalid—all sugar and no substantial. The
new education was to provide every element
going to make up the perfect nutriment.
The classics were not to be excluded, but
the sugar was to be allowed in proper pro-
portion with the lime and the phosphates.

The law was a noble and a statesmanlike
provision for the needs of the nation. Unfor-
tunately, like many another right endeavor,

it did not yield all that was hoped of it. Partly
through blameless and partly through blame-
worthy action and non-action on the part of
its friends, and of active opponents among
the duller members of the old school, the tree
has borne less fruit than was expected. In
some cases the land brought no important
income; in others it was given to old insti-
tutions in which the new movement found
no friends or earnest sympathy; in others
the special schools established were misman-
aged; only here and there, one among
many, was a success secured. One of these
successful "land grant colleges" was Cor-
nell University; successful largely through
the liberality, earnestness and wisdom of
Ezra Cornell, who gave it largely of his for-
tune and preserved to it the grand endow-
ment, it has already grown into a great
university, and exhibits, in its Sibley Col-
lege, one of the best illustrations of the be-
ginning of the working out of one essential
part of the problem set its managers by the
terms of the law, which, here at least, is
not forgotten. The persistent influence of
President White and the wisdom of the
older trustees during all its early history,
and the prominence which the great object
for which it was founded, and which was
the cherished object of Cornell as well as of
Sibley and of their colleagues in the ad-
ministration, the consciousness of the
faculty and the interest which all have felt
in their privilege and duty have all con-
spired to bring the college safely through
the period of doubt and danger. It is now
an assured success, and has, during the past
year, received a larger entering class of un-
dergraduates in regular course than Har-
vard or Yale, Columbia or Princeton—a
good evidence of the hold which this insti-
tution, still in its minority, has on the
hearts and sympathies of the people. The
new administration of Cornell University
under President Adams, and of Sibley Col-
lege under its director, Dr. Thurston, en-
ters upon a task the trying part of which
has been made ready to their hands. With
a new administration thus pledged to the
work, and with wonderful and still grow-
ing facilities for instruction, the future can-
not but look bright. Its faculty are in
much greater sympathy with the new educa-
tion than probably any other in the land;
its equipment is extraordinarily complete,
and its corps of teachers is ample in number
and in fitness for the work of instruction of its
800 or more students.

Sibley College is the School of Mechanical
Engineering of the University, and includes
in its programme courses of instruction in
mechanics, in the theory and practice of en-
gineering, in electrical engineering, railway
engineering, and marine engineering, as
well as some special work in art and in re-
search. Graduates of the schools of civil
engineering go there for more thorough in-
struction in mechanics; professors go for
work in advanced lines, and in investigation
and laboratory methods, and even the
students of foreign schools are proposing to
come to the United States and take work in
Sibley College. Its course includes all the
mathematics and applied science which are
considered to-day essential to such a course;
extended instruction in drawing, freehand
and mechanical, and in art industries; sys-
tematic instruction in the shops, including
wood-working, molding, blacksmithing and
machine work; extensive lines of work in
the physical and mechanical laboratories,
and miscellaneous literary and professional
work—all together keeping the students
very busy through a full four years of pro-
fitable and useful application. The work is
not such as one not having a talent for me-
chanics would choose; it is not always easy;
but those who have an aptitude for it do the
work with equal pleasure and success.
Graduates from these courses go out with
some knowledge of several trades, and of
shop ways and methods of manufacturing,
and take positions of responsibility and
profit very early in their business life.
There is always a demand for the best of
such—in the best sense—well-educated
young men. It is a great privilege to ob-
tain this training under all the influences of
life in a great university, gaining the
broader view, the larger comprehension,
and the wider knowledge of men and
things that come of constant contact with
all forms of culture. Students are always
advised, where it is practicable, to take
the academic education before going into
the professional courses. Some are able to
do this, and always with advantage. The
opportunities of listening to such great
authorities as are there lecturing regularly
or occasionally on all great subjects are
alone of extraordinary value to the intelli-
gent and earnest man.

A visit to this interesting spot surprises
and delights the visitor. The location of
the University, on the hillside, 400 feet
above the town of Ithaca, N. Y., on a mag-
nificent site overlooking the Cayuga Lake,
the number and extent of its buildings and
the completeness of its outfit, the number of
students from all parts of our own and other
lands who have gathered here for such
diverse purposes, and the extent and va-
riety of the courses of instruction—all
astonish one who only thinks of the institu-
tion as a young college, less than 20 years of
age. Several millions of dollars in build-
ings and equipment, a faculty of 50 profes-
sors, an annual expenditure of about \$250,-
000 in the instruction of over 800 students,
all these are marvels to the stranger look-
ing for a youthful school of the mechanic
arts and of agriculture. The latter depart-

ment is to many as interesting as that to which our attention has been mainly called. A system of bringing to Cornell as non-resident lecturers the ablest men and specialists in the country to discuss various important subjects is by no means the least of the various methods adopted to bring to the aspirant for knowledge all that the world can offer him. The Sibley College lecturers include nearly every member of the profession of recognized ability and experience. It would be impossible to present a satisfactory view of this typical and prosperous university, the one of all others in our country—and probably in any—which is approaching the realization of the dreams of the great thinkers of our own and other times.

An Important Barb Wire Decision.

On the 8th inst., Judge Treat, of the United States District Court, at St. Louis, Mo., promulgated a decision, alluded to in our Trade Report last week, which is regarded as very important by the barb-wire fraternity. He decided that the Ross barb for the manufacture of four-point barb wire is an infringement upon the Burnell patent. A brief history of the case will be of interest in this connection.

The Burnell patent for the manufacture of four-point barb wire is the property of the Iowa Barb Steel Wire Company, of Marshalltown, Iowa, and the Iowa Barb Wire Company, of New York. These companies have divided the territory between them, the Iowa Barb Steel Wire Company taking Illinois, Wisconsin, Minnesota, Iowa, Missouri, Arkansas, Kansas, Nebraska and Colorado, and the Iowa Barb Wire Company the remaining States. Subsequently to the granting of the Burnell patent, the Ross device was brought out, but a patent was never obtained for it. While similar in most respects to the Burnell barb, the Ross barb is somewhat simpler in construction, and the machines required for its manufacture are consequently less costly than those used in making the Burnell barb. The Ross barb was received with much favor by fence-wire manufacturers in the West, the "moonshiners" generally using it, principally to evade the royalty demanded for permission to manufacture patented barb wire, but also on account of the smaller amount of capital needed to go into the business. This occurred in the territory in which the Iowa Barb Steel Wire Company had control of the Burnell barb. This company regarded the Ross barb as an infringement upon their Burnell patent, and, to test the matter, they brought suit against the Southern Barb Wire Company, of St. Louis, who were manufacturing the Ross barb. After hanging in the United States Court for three years the case has just been decided in favor of the Iowa Barb Steel Wire Company.

The Southern Barb Wire Company had in the meantime passed out of existence, and was succeeded by the Southern Wire Company. The suit has therefore been won against a defunct company. This, however, is admitted by manufacturers of the Ross barb to be immaterial, the vital point being the failure to establish the claim for it of an original invention. Injunctions are now obtainable without further argument against every manufacturer using this barb, as well as against the sale of wire made with it in Judge Treat's district. There are a number of such manufacturers in other judicial districts, but, even if they are not disposed to abide by the decision in this test case, the owners of the Burnell patent will start with heavy odds in their favor in Judge Treat's decision in contests in other districts.

It is rather early to speak of the effect of this decision upon the barb-wire trade, but in view of the vast interests which have grown up under the use of the Ross barb it is believed that reasonable terms will be offered by the victorious company, and that no serious interruption to the course of this great business will occur. At the same time the owners of the Burnell barb are entitled to compensatory damages that will bear with crushing force on many of the Ross barb-wire makers if strictly imposed. The critical condition in which these manufacturers find themselves is shown by the haste with which a number of them have traveled to Worcester, Mass., to seek the intervention of the Washburn & Moen Mfg. Company.

Among the Western barb-wire manufacturers who do not use the Ross barb in making four-point wire there is a feeling of great satisfaction at the result of this litigation. They believe it will enable the trade to be more easily controlled in the future, especially if, as is now hinted, the Burnell patent should be transferred to the Washburn & Moen Mfg. Company. Such action would make the position of the latter company almost impregnable, and for several years, or as long as the patents run, their influence would be potent in preventing such demoralization as that through which the trade has recently passed. The Burnell patent is particularly desirable to this company, as it will not run out for several years after other leading patents have expired.

The decision in the Burnell case appears to be the end of the litigation affecting the patents on four-point barb wire, just as the Glidden case, decided in Chicago by Judge Hammond in 1884, was the last affecting two-point barb wire. We believe, however, that no negotiations looking to the purchase

of the Iowa Barb Wire Company's interest in the Burnell patent are in progress or have been initiated.

Late Developments in the Tin-Plate Market.

Under a good demand and diminished importation at New York tin plates have been slightly better during the first week of February, but as the month advanced activity slackened somewhat, and prices became easier, in view of some accumulation at English shipping ports and greater anxiety over there to sell. The import at New York during January did not exceed 114,525 boxes, compared with 166,555 boxes received during the corresponding month of 1886. Supplies on the spot are moderate and poorly assorted. Stocks are reported to have been well worked off in the interior likewise, and, as the general prospects for the spring trade are promising, the position of tin plates is considered sound, the more so as prices are low enough to stimulate consumption and susceptible of further improvement in England, in consequence of the advance in pig iron, blooms and bars, which should influence their price.

The amounts absorbed by this country have of late years been rapidly on the increase. Thus the net import last year reached 256,917 tons, against 228,249 the previous year—an increase of 28,668 tons or 12½ per cent. Messrs. Henry Nash & Co., Liverpool, in their circular of January 15, remark: "The outlook for the present year would appear more promising were it not that the capacity to produce appears a little ahead of consumption." In January, with many mills standing idle owing to strikes, the estimated productive power of Wales per annum was lowered to 8,086,000 cwt., as compared with 8,625,000 cwt., which was the estimate in January, 1886. But since then many of the idle mills, having arrived at an understanding with their workmen, are gradually resuming work. There were in January, 1887, 86 works, representing 391 mills, 80 of which were standing idle, leaving 311 in operation, against 345 in operation during January, 1886.

Altogether there were exported from England last year 6,695,500 cwt. of tin plates, against 5,954,560 in 1885, and 5,774,100 in 1884, home consumption being estimated not to have undergone any change during the three years. Adding for this item 1,750,000 cwt. each of the three years named, the combined exports and home consumption would be represented by the following figures: 1886, 8,445,500 cwt.; 1885, 7,704,560 cwt., and 1884, 7,524,160 cwt.

Export of Tin Plates from England.

	1876.	1881.	1886.
Tons.	Tons.	Tons.	Tons.
To France.....	5,731	57,355	4,315
To the United States.....	90,283	179,843	268,586
To Canada.....	4,439	11,796	13,609
To Australia.....	5,983	8,331	9,565
To other countries.....	28,228	37,396	49,311
Total.....	132,564	294,331	345,775
Value.....	\$2,891,693	\$4,163,132	\$4,630,484

While the amount shipped had increased 150 per cent. between 1876 and 1886, the value of the exportation was only 56 per cent. greater. Shipments to the United States alone as compared with the total export were as follows:

	United States. Tons.	Total export.		United States. Tons.	Total export.
1877.....	106,405	153,109	1882.....	214,552	265,021
1878.....	108,124	155,071	1883.....	215,442	269,375
1879.....	133,595	196,997	1884.....	211,860	268,776
1880.....	164,284	217,669	1885.....	223,869	297,726
1881.....	179,843	243,841	1886.....	263,585	331,775
Total.....	714,251	966,256	Total.....	1,129,308	1,355,607

There was a 50 per cent. increase in the shipments to all countries, America included, but the increase to the United States alone was 58 per cent., if we compare the aggregate shipments of the last five years with the preceding quinquennial period. The comparatively low price of tin plates at the present ruling is best shown by referring to the annual averages during the last decade:

	1877.	1878.	1879.	1880.	1881.
Charcoal.....	19/10	19/10	19/10	19/10	19/10
1877.....	19/10	19/10	19/10	19/10	19/10
1878.....	19/10	19/10	19/10	19/10	19/10
1879.....	19/10	19/10	19/10	19/10	19/10
1880.....	19/10	19/10	19/10	19/10	19/10
1881.....	19/10	19/10	19/10	19/10	19/10

Wherever steel plates are preferable to iron the former have rapidly taken the place of the latter in the American market—all the easier as the difference in price is not great. Some makers in Wales, in order to keep up the competition, had begun to turn out objectionable quality, which they sold low, but such brands have ceased to find a market.

The question now suggests itself whether American consumption will go on expanding at about the same rate as it has done hitherto. This may without fear be answered in the affirmative, unless the price rises so much as to be a check. The industries using tin plates in this country, especially for petroleum and canning purposes, are developing satisfactorily and steadily, so that their capacity for absorption is only limited by short crops, which in a country of such size and range of climate and soil are merely partial if they do occur. New uses are moreover continually found, especially since prime steel in tin plates has in certain branches of industry begun to supersede iron, as referred to above.

The final test of the cruiser Atlanta, which will very probably be made early next month, is awaited with some interest. The dry-steam apparatus with which the ship is to be provided is ready for erection, and with the experience gained during the earlier trial trips it is to be expected that the

performance of the vessel will prove reasonably satisfactory. The Boston, it is thought, will be in shape for trial at some time during the early summer months. As she is a sister ship of the Atlanta the advantages to be derived from last year's tests have, we trust, not escaped notice, and with due regard to the requirements which were then shown to exist, in addition to those already provided for in the design, a vessel capable of establishing a creditable record may be looked for.

The important bearing which relief holes in steam engine indicator cylinders have on the readings of the instruments has lately been made a subject of some comment. These relief holes, as may be known, are arranged above the indicator pistons and afford outlets for the steam leaking past the latter so that there can be no pressure above them. Pressure at those points would obviously make the pressures indicated on the diagrams too low and introduce errors into all the results calculated from them. While, therefore, indicator makers generally have sought to eliminate this source of error, it has nevertheless been found to frequently occasion trouble, and it is well to bear this fact in mind when making steam or power measurements. In some instances the holes may be too small to admit of a sufficiently rapid escape, while in others they may be wholly or partially closed by some defective arrangement. A case in point is cited in the last issue of the *Locomotive*. Examination of an indicator which had been sent on for the purpose of having the springs tested, showed that the vent holes in the outer body were completely closed by the screwed portion of the inner body to which the cylinder was attached, so that the only outlet for any escaping steam was the hole in the cap through which the piston-rod passed. It is evident that this was entirely insufficient, and there can be no doubt that, with even ordinary engine speed and average boiler pressure, sufficient back pressure, as we may call it, was produced between the cover of the indicator cylinder and the piston to seriously affect the card. It is well to repeat, therefore, the oft given advice that an indicator should never be applied unless the user has satisfied himself of the absence of similar sources of error. That to which we have specially referred here has very probably been recognized in comparatively few instances.

WASHINGTON NEWS.

(From Our Regular Correspondent.)

WASHINGTON, D. C., February 15, 1887.

The subject of revenue reduction and tariff revision having been laid aside for the present session, the organization of the next House on the basis of conservatism on the economic questions which have disturbed the peace of the majority in the present Congress is now being freely discussed. The margin of the majority will be so small that it will be an easy matter to prevent any ultra action. It is not so much the Speaker-ship as of the Committee on Ways and Means which will be the objective point in the next contest. In the next majority side of the House there will be 50 protection Democrats. This will not be sufficient to control the caucus, but by refusing to attend the caucus they will be able to hold the balance of power, and force the free traders to terms. The last act in the differences between the tariff and free trade wings of the Democratic party in the House have aggravated the feeling to an intensity which will be likely to cut off all chance of Carlisle's re-election to the Speakership. Unless the Randall men assent he cannot preside over the next House.

INCREASE OF THE NAVAL ESTABLISHMENT. By the decided vote of 37 to 17, Senator Cameron succeeded in having his bill for the construction by contract of 10 protected steel cruisers taken up for consideration. This bill provides for an expenditure of \$15,000,000 for that number of vessels, to have a maximum speed of not less than 20 knots over a measured mile. The provisions of the act of August 3, 1886, for the increase of the naval establishment are applied to the new vessels. A bonus for speed over 20 knots an hour is allowed the contractor as follows: For the first knot in excess of 20 knots, \$200,000; for the second knot so in excess, \$100,000; and for each knot beyond, \$100,000. For the purpose of these provisions \$2,000,000 are appropriated. The bill also appropriates \$1,800,000 for armament of these vessels. The bonus was amended granting \$100,000 for the first knot in excess of 20, and \$200,000 for each knot beyond. It was shown that the French cruisers have attained the highest rate of speed, while England, Italy, Chili and Japan rank next. Under this bill the American cruisers would rank first in speed. The discussion of the bill will be resumed.

COAST DEFENSES. The advocates of a system of coast defenses are directing their energies to a most determined effort to secure a liberal appropriation for the commencement of work in placing our coasts in a defensible condition. The obstructionists in the House are still persisting in their efforts to prevent action. The question, however, is now in such shape as to fix the responsibility for non-action. Judicious expenditures in this direction will assist in keeping the surplus revenues from accumulating in the Treasury.

THE STRUCTURAL COMMISSION. There is no more chance for action on the bill for the creation of a commission to test structural materials. The friends of the measure have abandoned it for this Congress, and hope to renew it under better auspices in the next. If this bill had been properly managed there could have been no reason why it should not have passed. There has been a sort of lachrymistic way of handling it from the beginning which has been the chief cause of its failure to secure consideration and action, as a majority of the House are in favor of its passage.

TARIFF CHANGES IN VENEZUELA. The Department of State is in receipt of notice of important tariff changes in Venezuela.

The importation of foreign lumber is effectually prohibited. It has also been decreed "that exemption from tariff duties will be only conceded for the importation of such machinery, appliances, raw material and other accessories as are destined to the establishment of new industries, and in no case for such as may be established and are able to live without the necessity of official protection." The custom hitherto has been the admission of all kinds of machinery free. A considerable share of certain kinds of machinery was received from the United States.

THE TARIFF OF CEYLON.

A publication of the existing tariff of Ceylon by the Department of State shows the following import duties on metals:

	Rupees.
Brass sheets, wire and nails.....	3.00
Copper bars, ingots, nails, tacks, &c.....	3.00
Bar iron, flat square bolts, rods.....	4.00
Angle Swedish bar, plate, &c.....	5.00
Corrugated.....	7.00
Galvanized.....	15.00
Nails, tacks and rivets.....	0.63
Pig.....	2.50
Lead, sheet, pipe and pig.....	10.00
Splinter, tin, zinc.....	10.00
Steel, blister.....	10.00
Steel, cast.....	12.50
Tin plates.....	0.75
Zinc, perforated.....	3.00
All machinery.....	Free.

THE TARIFF OF ECUADOR.

A reclassification of articles under the tariff of Ecuador places pig iron in class 3 at 1 cent duty per gross kg.; steel, nails, agricultural machinery, tin, iron rods and sheets, printing presses, agricultural and industrial machinery and zinc in class 4 at 2 cents per kg.; iron columns in class 5 at 5 cents per kg., and manufactured copper, brass, tin and wares of iron and tin in class 6 at 10 cents per kg.

LATEST CUSTOMS DECISIONS.

All iron bars, blooms, billets or sizes or shapes of any kind, in the manufacture of which charcoal is used as fuel, are held to be dutiable at the rate of \$22 per ton, under instructions of September 21, 1883, which had the effect of limiting the application of such provision to certain sizes and shapes of such iron, are amended so as to conform to this view.

Certain lamp-shades which are manufactured of paper and metal, the metal portion consisting of iron wires which serve the purpose of a frame, and which are of material importance in the construction of the shades, are held to be dutiable at the rate of 45 per cent. ad valorem for "manufactures, articles or wares," composed wholly or in part of iron.

A steam-pump and a drilling or boring apparatus, brought by a person arriving in the United States, are held to be liable to duty, inasmuch as being articles in the nature of machinery, which, when combined, constitute a large and powerful structure, they are not entitled to the privilege of free entry as "implements, instruments and tools of trade, occupation or employment of persons arriving in the United States," under the provisions in the free list, which expressly excludes from such privilege "machinery or other articles imported for use in any manufacturing establishment."

On the exportation of shanks manufactured wholly from imported steel, a drawback will be allowed equal to the duty paid on the imported material used in the manufacture, less the legal retention of 10 per cent.

Magazine Guns.

At the outbreak of the civil war in this country the best arms in the world were Springfield, Enfield and Minié rifles, all muzzle-loaders, and all throwing elongated conical balls at the rate of about one a minute, with everything working well. Sharps' carbine, an effective breech loader, using paper cartridges, had been introduced and used on a small scale. That was followed by the Burnside rifle, the first breech loading gun in this country using metallic cartridges, and it marked a great step ahead. It was followed in turn by the Spencer magazine gun—that is to say, a breech-loading gun carrying seven metallic cartridges in the stock of the piece, which could be fired with great rapidity—much greater indeed than had ever been reached before; then a pause to recharge the magazine, and then again another seven shots in about 10 seconds! This was by far the best gun ever invented up to 1865, and was used with great effect as an arm for cavalry and mounted infantry. General Wilson had 15,000 men of his corps armed with them in the campaign from Nashville to Macon, and it is susceptible of proof that no charge made by troops carrying these guns, whether against intrenchments or soldiers in the open, was ever repulsed. As against any form of muzzle-loader it was simply invincible, though it was not theoretically a perfect arm. The necessity for carrying in the magazine as many cartridges as possible resulted in shortening the cartridge and limiting the quantity of powder, so that the range was not so great nor the trajectory so flat as they should have been. But this was due to details of construction, and it is safe to say the arm had in it every successful feature of the best gun of 20 years later. Curiously enough, however, it was looked upon as an expensive and wasteful innovation, and was condemned on that account by many distinguished soldiers, and among them General Hancock, who, although as good a corps commander of infantry as ever lived, thought it would be wiser to adhere to the muzzle-loading rifle. The world has, however, moved beyond that, and now all nations are buying breech-loader magazine guns.

In 1882 orders were issued from the headquarters of the army at Washington, in pursuance of an act of Congress, convening a board of experienced army officers for the purpose of selecting magazine guns for the United States military service; and, after a series of competitive trials extending over a part of two years, the Board selected 3 guns, the Lee, of Lee-Remington, the Chaffee-Reece and the new Hotchkiss, as representing the different systems of detachable and fixed magazines, and also as possessing a remark-

able degree of efficiency as single loaders. These guns were thoroughly tested for rapidity with accuracy, rapidity at will, endurance, defective cartridges, dust, rust and excessive charges. A number of supplementary tests were also applied. About 40 guns of different pattern were presented; many of them were excellent, but the three in the order above named were selected as the best for further trial by the troops in the field.

Seven hundred and fifty of each were bought and issued in 1884, and the reports from 149 companies have been received and tabulated at the Ordnance Office in Washington. They show a very great preference for the Lee gun over the other magazine guns; but, curiously enough, comparing the three magazine guns with each other and with the Springfield breech loading service rifle, as single loaders and for all uses, they show a very large preference for the Springfield rifle. The Chief of Ordnance, in his official report to the Secretary of War of December 15, 1885, says: "After a careful consideration of these reports I am satisfied that neither of these magazine guns should be adopted and substituted for the Springfield rifle as the arm for the service." He adds, however, "I have been, and am, an advocate for a magazine gun, but it would seem the part of wisdom to postpone for the present any further efforts toward the adoption of a suitable magazine arm for the service. The Springfield rifle gives such general satisfaction to the army that we can safely wait a reasonable time for further developments of magazine systems."

Accordingly, those 2250 magazine guns have been called in and stored at various places, and no more have been bought or issued. They constitute our entire stock of that kind of arms, but it is believed that the private armories of the country can turn out any quantity of them as fast as they would be required under any possible emergency, and they could probably do this more rapidly than any other power could turn out any similar arm. This is very poor consolation, but such as it is we must put up with it.

The Lee gun belongs to a class firing by a bolt, it has a detachable magazine carrying five cartridges, and can be fired rapidly as a single loader. With the magazine it can throw about 35 shots per minute, or 63 in 2 minutes, and with skill on the part of the person shooting, it has thrown as high as 10 shots in 9 seconds, and 50 in 1 minute. The Chaffee-Reece is a bolt gun with magazine in the stock, carrying seven cartridges. It threw 10 shots in 17 seconds, 23 in 1 minute, and 41 in 2 minutes. The Hotchkiss is also a bolt gun with magazine in the stock. It threw 10 shots in 17½ seconds, 31 shots in 1 minute, and 45 in 2 minutes.

So far as concerns the relative merits of a detachable magazine or a permanent one under the barrel or in the stock, there is little difference. They all work well, but the better opinion seems to be that the magazine should not be detachable, for the reason that anything detachable may be thrown down or lost. European nations, so far as we can learn, have generally adopted bolt guns with a permanent magazine under the barrel, which can be used as single loaders also. American guns are generally better finished than European guns, but there is no reason for believing that they are any more effective. France and Germany have been making extraordinary exertions to supply their men with magazine guns. The former has adopted for its navy, and perhaps for its army, though this is mere conjecture, the Kropotchev magazine rifle, and it is reported by cable that General Boulanger expects to have 400,000 in the hands of the troops by the 1st of April. Germany has adopted the Mauser rifle, as modified in 1884, and is said to be arming its entire infantry force as well as its navy with it.

Russia has adopted the Berdan breech-loader, Austria the Mannlicher magazine rifle, Italy the Bertoldo magazine rifle, which is a modification of the Vetrili breech loader. Turkey has bought many improved firearms of American patterns. The Lee-Remington has been sold in large quantities to the Chinese, and, all things considered, it is probably the best gun yet introduced into general use. It will throw a greater number of bullets than any other in 10 minutes, and what is perhaps of still greater importance, a greater number than any other, with the possible exception of the Winchester, in 10 seconds.

Experts regard the magazine gun as of great importance for emergencies—that is to say, to deliver five, seven, or even more shots, as the case may be, in the shortest possible time. There are at least 20 excellent magazine guns now extant, and more are coming forward every day. Colonel Whitmore of our Ordnance Corps has invented several, one a single loader of great simplicity, which throws 35 shots per minute, and a magazine gun, not yet perfected, which promises still greater results. These guns may now be made alike for cavalry and infantry, the barrel being about 30 inches long, and the piece from 45 to 48 inches over all. Every variety is interchangeable, and they weigh from 9 pounds 4 ounces to as much as 12 pounds. The Lee-Remington weighs, fully loaded, just 9 pounds. The American caliber is .45 inch, and the best opinion is that any nation which adopts a caliber of less than .40 inch makes a great if not a fatal mistake. The usual service charge is from 70 to 90 grains of powder.

The whole subject may be summed up by the remark that the best American magazine gun now fires 10 shots in 9 seconds, or one a second, and from 35 to 40 per minute as a steady business. The trajectory is extremely flat, and they kill at the range of a mile, or about as far as one can see a man in the open. And the final fact is that while our private armories turn out perhaps the best guns in the world, and all the leading nations of the earth are buying and introducing them, or guns which they believe to be as good, all of which have magazines attached, our own army is still using the Springfield single loader, and our War Department deems it the part of wisdom to postpone for the present any further effort toward the adoption of a suitable magazine arm for the service.

Trade Report.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, February 16, 1887.

Scotch Pig.—At the close the market is irregular, and maker's brands are quoted as follows:

Coltness, alongside, Glasgow	57/6
Langloan	58/6
Glenarnock	59/6
Gartsherrie	51/6
Summerlee	55/6
Shotts	51/6
Dalmellington	47/6
Carnbroe	48/6
Eglington	46/6
Carriage from Ardrossan to Glasgow 1 1/2 ton	

Cleveland Pig.—There is no change to note in this market.

Bessemer Pig.—W. C. Hematites are unchanged, mixed lots, Nos. 1, 2 and 3, remain at 49/ at 50/.

Bessemer Blooms.—Blooms, 7 x 7 inches, remain unchanged at 80/ at 85/ at shipping ports.

Manufactured Iron.—The market is a little steadier. Prices may be quoted as below:

Staff, Ord. Marked Bars	£ s. d.	£ s. d.
" Common	7 0 0	7 10 0
" Medium	6 0 0	6 10 0
" Heavy	5 0 0	5 10 0
Hoops, 20 W. G. and over		
" Common Best	6 15 0	6 10 0
" Medium	6 0 0	6 10 0
" Heavy	5 0 0	5 10 0
Sheets, 20 W. G. and under		
" Ordinary Best	7 5 0	8 0 0
" Common	6 5 0	7 0 0

Steel Rails.—The market is unchanged. We quote Ordinary sections, £3. 17/6 @ £4. 2/6.

Old Rails.—The market is unchanged, last week's quotations still ruling—viz., Tees, c.i.f., New York, 70/ at 72/.

Copper.—The market closes irregular, with Chili Bars at £39. 10/ at £40.

Tin.—The market is irregular, with Straits, spot, quoted at £101. 5/ @ £102. 15/ and futures, £102 @ £102. 10/.

Tin Plates.—The market is irregular with prices nominally unchanged as follows:

Tin Plates, 10x14, 1st qual. Charcoal	18/ @ 19/
" " " " "	16/ @ 17/6
" " " " "	15/ @ 16/6
" " " " "	13/ @ 13/6

Spelter.—The market is unchanged. We quote the following prices: Ordinary at shipping ports, £14. 10/ @ £14. 15/.

Freights.—Steam freights from Glasgow to New York are 7/6 at 8/.

Financial.

Office of The Iron Age, 36 and 38 Clark St.,
WEDNESDAY EVENING, February 16, 1887.

Now that the embargo upon commerce caused by labor disturbances has been raised, it is safe to assume that the business of this port has resumed its normal proportions, and that the situation will rapidly mend. Merchandise is already moving forward in full volume by the interior routes, and a corresponding improvement may be expected in the export trade, where the refractory coal-handlers and longshoremen caused the principal mischief. The exports are again up to the usual average, showing a gain of more than \$1,600,000 on the previous week. In general trade there is a better tone. Wheat is irregular, with more export trading. Corn lower. Cotton dull. Coffee weak and lower. Oils are quiet. Refined petroleum is easy, with a moderate export demand. In provisions speculation is active; prices strong. Lard active and higher. Hides and leather steady. Raw sugar steady, but quiet. In ocean freights grain is again fairly active. In the coal transportation business it would appear that the chief difficulty has been overcome. Among dry goods jobbing shipments are made with promptitude, and as a consequence the presence of buyers in the market is more observed. Nevertheless, heavy floods in various sections and bad roads have had a retarding influence. Taking all in all, the general trade situation is satisfactory and the outlook more hopeful every day. The steadiness in the volume of trade under recently adverse conditions is especially noteworthy, and with a free movement of coal, which must soon prove sufficient for all demands, the feeling of confidence will be strengthened. The clearings of 35 cities last week aggregated \$973,830,666, as against \$999,193,659 for the corresponding week last year—a decrease of 1.8%. Outside of New York the clearances were \$308,756,019, against \$278,491,701—an increase of 10.9%. New York shows a decrease of 6.9%.

It is expected that a call for \$10,000,000 3% bonds will be issued next week.

Stock Exchange markets have been irregular, with a downward tendency. Varying prices in London were the chief factor on Thursday and Friday. Erie shares were largely dealt in. On Saturday the strike collapse was followed by an important advance, but free selling caused reaction. The coal shares showed the most improvement. On Monday the coal shares again led, but in the late trade the advance in sterling exchange induced free selling. On Tuesday stocks were dull and heavy until the last hour, when there was a recovery, which brought prices up to the opening level.

Money continues easy, with little change in rates. Good commercial paper is on the market in large amounts, and contrary to their recent disposition the local banks are purchasing liberally. The bank return for the week shows a decrease of \$1,862,150 in surplus reserve, which now stands at \$18,600,600, as against \$34,468,000 a year ago, and the loans are expanded \$6,401,700; deposits are up \$4,136,600. Loans are quoted about 4 1/2%, 60 and 90 days. London advances show that on Saturday there was a strong downward reaction, so that stocks were again thrown on the market from Berlin and Paris, removing the depression of the previous week. It is admitted that the condition of affairs on the Continent is still critical, despite recent peaceful assurances, and in newspaper discussions the probabilities of peace and war are about evenly balanced. In the New York market, as a consequence of considerable sales of securities on foreign account, coincident with a reduced volume of exports, the current of exchange verges near the point where an outward movement of gold may be expected. On Monday sterling was advanced 1/2 cent to \$4.86, the posted rates standing \$4.86 1/2 @ \$4.89 1/2.

According to the Custom-House report the exports of specie from this port during the week were \$947,070, including \$365,000 in silver bars, making a total since January 1 of \$2,188,765, against \$5,332,000 for the same time last year, and the imports for the week were \$30,660, making a total since January 1 of \$3,436,000, against \$1,381,000 for the same time last year.

Among the favorable indications are the reported earnings of 97 railroads for January. According to the *Financial Chronicle*, the percentage of increase, compared with last year, is 20.9% in earnings, against 4.7 in mileage, and only three roads out of the 97 show decreases. Most of the lines are fully employed, and some of the smaller ones find their rolling stock inadequate for the business offering. The trunk line presidents have concluded that the new interstate law will not affect their organization, and say that, while the pool may disband, there will be "an understanding between gentlemen." The existing arrangements will continue, but a more appropriate name than "pool" will be adopted.

A bill for the purchase of a site for the New York Custom House is on its passage through Congress. If one block is purchased it is not to exceed \$800,000 in cost, and is to be used as a site for the appraisers' stores building, while if two blocks are purchased the limit of cost is fixed at \$1,500,000, and upon this site is to be erected a new Custom House and appraisers' stores buildings. In the House the Senate bill for the retirement of the trade dollar was amended so as not to make the recoined trade dollars a part of the silver bullion required to be purchased monthly.

The New York City Comptroller opened bids for \$3,000,000,000 of registered water stock, and there were 23, amounting to \$13,545,000. The bonds bear 3 per cent. interest, payable in 1905. The highest bid was \$4103.87, and the average about \$103 1/2, which will yield to the city the amount of the first year's interest.

The Western National Bank was organized by the election of Secretary Manning as president, United States Treasurer Jordan as vice-president, and F. Blankenhorn, cashier. The formal resignation of Mr. Manning as Secretary of the Treasury was submitted by him to the President on Monday.

The imports of merchandise at this port during the week are \$677,000 above those of the previous week, the total valuation being \$9,583,484, making the aggregate since January 1, \$51,420,362, against \$48,378,000 for the same time last year and \$47,515,500 in 1886. Of the total nearly one-half represents dry goods. Exports are fast rallying from the temporary depression caused by strikes, of which the full effects were shown in a reduction of \$2,376,173 for the week to February 8. For the week just ended the exports were valued at \$5,192,308, an increase of \$1,655,922 over the preceding week, and \$5,181,182 more than for the corresponding week of last year.

The business failures occurring throughout the country, as reported during the week, number for the United States 231, and for Canada 36, a total of 267, as compared with a total of 261 for the previous week. In Canada and the British Provinces the business casualties are considerably in excess.

Old Metals, Rags, &c.

The purchasing prices offered by dealers are as follows:

Heavy Copper	10.08
Light Copper	9.07
Copper Bottoms	9.07
Brass, Heavy	6.07
Brass, Light	6.06
Composition	0.85
Lead, Heavy	80.08
Lead, Light	80.07
Zinc	0.08
Wrought Iron	16.00
Light Iron	10.00
Stove Plate Iron	10.00
Machinery Iron	13.00
Grate Bars	7.00
Old Rubber	0.08
White No. 1	0.08
White No. 2	0.08
Canvas, Linen, No. 1	0.04
Canvas, Cotton, No. 1	0.04
Canvas, No. 2	0.02
Seconda	0.01
Soft Woollens	0.05
Mixed Rags	0.01
Gunny Bagging, No. 1	0.10
Gunny Bagging, No. 2	0.08
Book Stock	0.05
Newspapers	0.01
Waste Paper	0.01
Kentucky Bagging	0.08
Kentucky Bale Rope	0.08
Kentucky Bagging	0.08

NEW YORK.

American Pig.—The same features characterize the local markets, high prices being realized for small lots, or for brands sold up but available in the hands of dealers, while those furnaces which have not contracted for their full make, and their number is few, are accepting lower figures. We hear of a sale of a 1000 ton lot of Hudson River Iron at \$22 and \$21 respectively for No. 1 and No. 2 Foundry, spring delivery. The reports from the West that some Southern Iron is being diverted into Atlantic Coast markets cannot be confirmed in this locality. The only Irons are a lot of 500 tons of low grade Southern Pig, and small lots of Virginia Foundry Irons. The majority of the Southern furnaces have thus far been unable to fill their orders, and are quoting prices too high for this market. In Gray Forge we note a sale of 1500 tons at a price at furnace equivalent to a shade under \$18. It is believed that considerable requirements are being held back pending the opening of navigation.

Scotch Pig.—There are no features of any special interest. We continue to quote as follows: Coltness, \$23 @ \$23.50; Glenarnock, \$22.50; Shotts, \$22.50; Carnbroe, \$22; Clyde, \$21 @ \$21.50; Dalmellington, \$21 @ \$21.50, and Eglington, \$21 @ \$21.50, all to arrive.

Bessemer Pig.—The transactions alluded to last week, to which 5000 tons must be added, were for a steel works in the East which was unable to prepare its own furnaces at a sufficiently early time. There are some inquiries in the market for early delivery of Foreign ordinary grades, but there is difficulty in filling these at the prices offered, the lowest figure at which iron is available being \$21.40 @ \$21.50. Quite a demand has sprung up, however, for special open-hearth grades for new steel works East and West. There have been a number of sales of 1000-ton lots of Foreign and one sale of 5000 tons Domestic in the Pittsburgh market. We hear of further inquiries, among them one lot of 5000 tons for the West.

Bar Iron.—There continues to be considerable pressure for early deliveries for carwork, otherwise the market is quiet. We quote: Common, 2¢ @ 2.10¢; Medium, 2.10¢ @ 2.20¢, and Refined, 2.20¢ @ 2.50¢, in round lots on dock.

Structural Iron.—The market is comparatively quiet. We quote according to quality, for Angles, 2.40¢ @ 2.60¢, delivered, and Tees at 2.75¢ @ 3¢, for round lots. Steel Angles are quoted 2.60¢ @ 2.70¢, according to quality. Store quotations remain 2.75¢ @ 2.85¢ for Angles and 3¢ for Tees. American Beams and Channels are 3.5¢ base from dock for all orders.

Plates.—We quote for round lots: Common or Tank, 2.45¢ @ 2.6¢; Refined, 2.50¢ @ 2.60¢; Shell, 2.7¢ @ 2.8¢; Flange, 3.7¢ @ 3.8¢; Flange, Extra, 4 1/4¢ @ 4 1/2¢. For small lots of Steel Plates the quotations are as follows: Tank, 2.90¢ @ 3¢; Ship, 3¢; Shell, 3 1/4¢ @ 3.50¢; Flange, 3.60¢ @ 3.75¢, and Fire-Box, 4.40¢ @ 4 1/2¢, on dock.

Billets and Slabs.—There have been sales of Imported Billets of 1000 and 1500 ton lots at \$32.50, chiefly for early delivery, and there are now pending negotiations for at least one large block. In Nail Slabs little business has been done, but there is a large inquiry in the market. We quote \$32 @ \$33.

Spiegel Eisen.—Beyond some call for prompt shipment lots, of which there has been a sale of 1000 tons at \$28.50, little business is doing. We quote for later delivery \$28 @ \$28.25.

Wire Rods.—The market is fairly active and firm, a number of sales of moderate sized lots having taken place during the week at \$42.50, nearly all of it for prompt delivery and for the West, where rods are wanted in a number of cases to fill up the gaps left by scarcity of raw material prior to the opening of canal navigation. The heavy business which comes for delivery after the opening of canal navigation has not as yet been fairly started.

Old Rails.—Efforts to sell on the part of weak holders on both sides of the Atlantic have led to a weakening so far as lots afloat and in port are concerned, those holdings being almost exclusively speculative. Since buyers East and West are pretty well provided with material for the near future, these lots are difficult to place, and have been offered as low as \$23.75 @ \$24 for Tees, and \$24.75 @ \$25 for Double Heads. Western buyers do not want them, since they require only such stock as can be delivered after opening of navigation inland. During the week foreign prices declined to a point as low as 68/6, but have since rallied. There are still one or two 1000-ton lots afloat and in port for sale, but it is believed that the bulk of the material held by weak holders has been closed out. For shipment chiefly for the West some business in a number of round lots has been done, and generally considerably higher prices have been realized than those quoted above, in some instances Tees netting here close upon \$25, and Double Heads \$26.

Steel Rails.—The market has shown more activity. In the East we note, among others, two sales of about 4000 tons each, one to a New England road and the other by an Eastern mill for St. Louis delivery,

September-October. In the West the movement for later delivery has begun, and sales between 45,000 and 50,000 tons are reported, among them one lot of 26,000 tons by a mill in Western Pennsylvania to a new road in the Northwest. We quote for standard sections, at Eastern mill, nominally, \$39 @ \$40, the net price at mill fluctuating considerably as to time of delivery, locality and the condition of the order books of the mill.

Scrap.—The market continues quiet and dull, with yard lots held at \$25, and foreign for shipment quoting at \$23.25 and \$23.50.

Rail Fastenings.—Railroad Spikes have been advanced to 2.75¢, while Boat Spikes are higher by \$2 1/2 ton. We quote Spikes 2.60¢ @ 2.75¢, delivered. Angle Fish Bars may be quoted 2.20¢ @ 2.25¢. Bolts and Square Nuts are 3.10¢ @ 3.20¢, and Bolts and Hexagon Nuts 3.25¢ @ 3.35¢.

Philadelphia.

Office of The Iron Age, 220 South Fourth St.,
PHILADELPHIA, February 15, 1887.

The week has been one of unusual dullness as far as new business is concerned, but it is difficult to find any change in the position otherwise. Mills and furnaces have all the orders they can attend to, and if there is an absence of buyers, there is at least an equal scarcity of sellers. Of course this cannot continue indefinitely, but the chances under the present outlook are no less favorable to sellers than they were three or four weeks ago, when the demand was far more active than it is now. The real sustaining element, after all, is consumption—not buying. Buying may continue and prices advance rapidly, in the belief of still higher prices, but without steady consumption the end is soon reached, and there can be no recovery until consumption again makes itself felt. In the present case, the belief is, that the break in prices of Old Material and the danger of foreign competition has put a stop to speculative buying, so that the market is now simply waiting for developments. Meanwhile every ton of Iron turned out, either at mill or furnace, is taken for consumption, and, so far as at present appears, consumption is likely to be not only maintained, but increased during the next three or four months. With this prospect in view, sellers show no anxiety in regard to prices, believing that when they have anything to offer there will be no scarcity of buyers at prices not less than are current to-day.

Pig Iron.—The absence of sellers has been nearly equalled by the absence of buyers. No. 1 Foundry is almost unobtainable, unless in very small lots. No. 2 is by no means abundant, while Gray Forge may be called unusually scarce. Large consumers—indeed, we may say, nearly all classes of consumers—bought liberally before the first of the year, so that there are only a few stragglers to provide for, and they find it hard enough to get what little stuff they require. The time is drawing nigh, however, when contracts will have to be renewed, but it is difficult to say at what figures. As remarked in this column a couple of weeks ago, there is no market—therefore no quotations, except on small lots for immediate delivery. What will be done for large consumers, with deliveries extending to midsummer, remains to be seen. Cost of production is steadily creeping up, and, as there are no accumulations of stock, sellers will be in a position to almost name their own figures, although there is little doubt that they will strongly favor the conservative side. Sales this week have been made in 1000-ton lots Gray Forge, \$18 at furnace, and No. 1 Foundry at \$21.50 @ \$22 at furnace, and it is not improbable that within 50¢ either way these quotations will be made for large lots, summer deliveries, although the position is such that the market would easily respond to new developments, favorable or unfavorable. Compared with last week there is probably less difficulty in picking up a few lots of Gray Forge. In fact, we doubt if \$18 would have been accepted for Gray Forge to days ago, while at least three lots of 1000 tons each have been secured this week, with a possibility of a little more at same price being available to the right parties. No. 1 is undoubtedly scarce, and \$22.50 at tide a very inside figure, \$23 being the usual quotation. No. 2 has been sold at \$21.50 at tide, although \$20.50 @ \$21 is mentioned in some cases. To summarize, we should say that the market is steady and firm, notwithstanding a little more disposition to meet the demand for Mill Irons at about \$18 at furnace.

Foreign Iron.—Some indications of a desire to purchase have been manifested, but the result has not been encouraging to sellers. A few small lots of Bessemer have been taken at about \$21.50 at tide, but sellers find it hard to offer anything at less than \$21.75, which is above buyers' views. There are bids of \$27.50 for 20¢ Spiegel, but \$28 is asked. Middlesboro' No. 3 nominal at \$18.25 asked.

Blooms.—Buyers and sellers are somewhat apart in their views, hence very little business has been done of late. Asking prices about as follows: \$30.50 @ \$31, c.i.f., duty paid for Rail Blooms, and \$32.50 @ \$33 for Nail Slabs; Sheet-Iron Billets, \$35 @ \$37; higher qualities for Boiler Plate, &c., \$38 @ \$44. American Blooms as follows: Char-

coal Blooms, \$55 @ \$56; Runout Anthracite, \$47 @ \$48; Scrap Blooms, \$37 @ \$38, and Ore Blooms, \$36.50 @ \$37.

Muck Bars.—Demand less active and prices a shade easier. Sales have been made at \$35.50 @ \$36 at mill, but \$35 @ \$35.50 would be accepted to day for moderate-sized lots.

Bar Iron.—The market has had rather a quiet appearance of late, but buyers find prices stubbornly firm. Consumption is very large, and, as the mills are all fairly supplied with orders, there is no disposition to shade prices. Prospects for the spring trade are also of an encouraging character, which with the increased cost of production makes sellers somewhat chary in quoting on large lots. The demand for Skelp Iron also appears to be assured during the spring and summer months, so that the chances of anything less than to-day's quotations are thought to be extremely doubtful. We quote medium quality Bars, 2.05¢ @ 2.15¢; Best Refined, 2.25¢ @ 2.3¢; Grooved Skelp, 2.2¢ @ 2.25¢, and Sheared, 2.45¢ @ 2.5¢.

Plate and Tank Iron.—The demand has been only moderate, but there are no indications of work giving out nor of any weakening in prices. Some orders have been placed and others are under negotiation, and still more likely to be on the market soon, so that manufacturers are not at all uneasy in regard to the future. Prices about as follows: Ordinary Plate, 2.50¢ @ 2.55¢, delivered; Tank, 2.5¢ @ 2.6¢; Shell, 2.75¢ @ 2.85¢; Flange, 3.75¢; Fire-Box, 4.75¢; Steel Plates, Shell, 3.55¢; Flange, 3.75¢; Fire-Box, 4 1/4¢ @ 4 1/2¢.

Structural Iron.—As regards new business the market may be called quiet, but the mills are all full of work for weeks to come. The outlook is considered most encouraging, however, and a large amount of new work will certainly be on the market in course of the next 30 or 60 days. Prices are therefore firmly maintained at about the following quotations: 2.5¢ for Bridge Plate; 2.30¢ @ 2.40¢ for Angles; 2.8¢ @ 2.9¢ for Tees, and 3.3¢ for Beams and Channels.

Sheet Iron.—The demand is very fair, with some disposition to place orders for summer delivery, a feature which does not meet with much encouragement from sellers. Lots for spot delivery or for next month command about the following prices for the best makes:

Best Refined, Nos. 26, 27 and 28	4¢
Best Refined, Nos. 18 to 25	3 1/2¢
Common, 1/4¢ less than the above	
Best Bloom Sheets, Nos. 26 to 28	4 1/4¢ @ 5¢
Best Bloom Sheets, Nos. 22 to 25	4 1/4¢ @ 4 1/2¢
Best Bloom Sheets, Nos. 16 to 21	3 1/4¢ @ 4¢
Blue Annealed	3¢
Best Bloom, Galvanized, discount	37 1/2¢
Common, discount	36 1/2¢

Steel Rails.—Prices have been gradually hardening, until they have at last reached \$40 at mill, at which rates several good-sized lots have been taken. The usual quotation is now \$41 at mill, but for desirable orders it is possible that \$40 @ \$40.50 might be accepted, although the feeling is very strong, and still higher prices are predicted by inside parties.

Old Rails.—The market has been very dull for the past two or three weeks, but there are some indications of a reaction. Buyers seemed to have disappeared entirely, so that prices were almost nominal, although sales were made as low as \$24 @ \$24.50 for tide-water deliveries. A sale of 1000 tons of Tees is reported to-day at a better rate, however, and with light offerings the market has a steadier look, with limited offerings at about \$24.50 for T's and \$25.50 @ \$25.75 for Bridges and D. H's.

Scrap Iron.—Demand somewhat better, and prices steady at about the following quotations: Cargoes of No. 1 Scrap offered at \$23.50, with \$23 bid; small lots, tide water delivery, \$24; Selected do., \$25 @ \$25.50; No. 2 do., \$16 @ \$18; Turnings, \$15 @ \$16.50; Old Car Wheels, \$17 @ \$17.50; Old Steel Rails, \$21.50 @ \$22.50; Cast Scrap, \$16 @ \$17; do. Turnings, \$12 @ \$13. Old Fish Plates, \$20.50 @ \$30.50.

Wrought-Iron Pipe.—There is an active demand for all sizes. Manufacturers say they have all they can attend to and are making strenuous efforts to stock up so as to be in readiness for spring trade. Butt-Welded Black and Butt-Welded Galvanized have been advanced 2 1/4¢. Discounts are as follows: Lap-Welded Black, 50¢; Lap-Welded Galvanized, 32 1/2¢; Butt-Welded Black, 32 1/2¢; Butt-Welded Galvanized, 22 1/2¢; Boiler Tubes, 47 1/2¢.

Nails.—There is only a moderate demand reported at \$2.50 from store. We hear of no cutting whatever, the above price being well maintained. Manufacturers show no disposition to advance card rate, preferring rather to wait until old contracts made at lower figures are filled.

Chicago.

Office of The Iron Age, 36 and 38 Clark St.,
Cor. Lake St., CHICAGO, February 14, 1887.

Pig Iron.—A considerable quantity of Pig Iron has been sold in this market during the past week, but the upward tendency in prices which was such a conspicuous feature a short time ago seems to have disappeared. While no weak spots have developed, it is manifestly easier to buy some kinds of Iron, more particularly Coke Foundry and Lake Superior Charcoal. Prices are perhaps no lower than they have been, but sellers are generally more disposed to meet buyers' wishes in the matter of deliveries during the summer months. Some furnace agents

are of the opinion that Lake Superior Charcoal Iron will command a much higher price after the spring trade opens, and are asking outside figures for what they have to sell, but others take a conservative view of the situation, and continue to book orders at the old rate, believing that the supply will keep pace with the demand. While nobody fears a decline in prices in the immediate future, the preponderance of opinion inclines in favor of the prevalence of existing rates rather than an advance. The increased cost of Coke and higher freight rates have had but slight effect on the selling price of Coke Irons here. This is a singular fact, and can only be accounted for on the theory that the makers believe that prices of Iron have gone as high as the present condition of trade will warrant, and that other influences must be felt before quotations are advanced. It must not be understood, however, that there is but a small demand for Pig Iron. On the contrary, inquiries continue to be received by furnace agents, and in some cases they are asked to name prices on quite large quantities. This is especially the case with Lake Superior Charcoal Irons. But these inquiries are mainly in the nature of options, based on pending contracts for car work, and furnace agents are generally refusing to quote under such circumstances, preferring to wait until the consumers really need the Iron, and are prepared to say just what they want and when they will take it. Under existing circumstances the market is more in buyers' favor than has been the case for some time, but it would take a very slight increase in the demand to change in the other direction. Quotations continue as follows on a cash basis, time rates being usually 50¢ per ton higher: Lake Superior Charcoal, Nos. 1, 2 and 3, \$24 @ \$25; Blackband Coke Softeners, \$24.50; Hanging Rock and Jackson County Soft, \$22.50; Straight Coke Foundry No. 1, \$23 @ \$24; No. 2, \$22 @ \$23; No. 3, \$21 @ \$21.50; Southern Coke Foundry No. 2, nominally, \$22.50 @ \$23.

Bar Iron.—Car builders have pretty generally supplied their needs for the present, and the cessation of the demand from this quarter relieves the market of considerable pressure. A fair run of orders is being received from other directions, however, and, as the mills are now pretty well supplied with work for the next 60 or 90 days, prices are steady. Quotations range from 2.15¢ to 3.3¢ on cars and from 2.3¢ to 2.5¢ from store, according to quality and quantity. An order may occasionally be placed at a less rate, but under exceptional conditions.

Structural Shapes.—Under this head there is nothing new to report, except that more work is coming in sight as the building season approaches. Beams and Channels are still quoted at 3.8¢ from store; Angles, 2.8¢ @ 3¢ from store, and 2.55¢ on cars; Tees, 3.25¢ from store; Universal Mill Plates, 2.67½¢ on cars.

Plates.—A great deal of work is coming on the market, for which large quantities of both Iron and Steel Plates will be needed. Tank is quoted at 2.6¢ @ 2.65¢ on cars here, but much depends on the condition of the mill applied to, some mills being practically out of the market. Jones & Laughlins quote 2.8¢ @ 3¢ out of store for their Refined Plate. Other store prices are as follows: Iron Tank, 2.8¢; Shell, 3.25¢; Flange, 4.25¢; Steel Shell, 3.5¢; Flange, 4.25¢; Fire-box, 4.75¢.

Sheet Iron.—Business continues in the same condition as that reported last week. Inquiries are numerous; small sales are being made quite freely, and occasionally a good-sized order is booked, but as yet the season has not opened fairly. With the ruling disparity between Bars and Sheets manufacturers' agents are inclined to believe Sheet Iron a good purchase. They quote for Common Black in carload lots, usual terms, as follows: No. 27, 3.2¢ @ 3.25¢; Nos. 25 and 26, 3.1¢; Nos. 22 to 24, 3¢; Nos. 18 to 21, 2.9¢; Nos. 15 to 17, 2.75¢; Nos. 10 to 14, 2.65¢. From store jobbers quote 3.4¢ for No. 27, 3.3¢ for Nos. 25 and 26, and 3.2¢ for No. 24. Galvanized Iron is still moving sluggishly. It is stated that business in this line has been unremunerative so long that a number of manufacturers have ceased to compete for orders, and have either wholly suspended operations or turned their galvanizing plant on other work. Manufacturers' prices to jobbers are still 62½¢ off on Juniata and 62½¢ and 5¢ off on Charcoal, while jobbers quote 60¢ off on Juniata and 60¢ and 5¢ off on Charcoal.

Merchant Steel.—Contrary to general expectation, no concerted advance was made on Crucible Steel products during the week. Messrs. Miller, Metcalf & Parkin have withdrawn quotations for Steel and Springs, and announce by circular that they will name prices by mail or wire on application, and fill orders entrusted to them at ruling prices. Other houses may have taken similar action, but sales during the week were generally made on the basis of our former quotations—viz.: Ordinary Tool Steels, 8¢ @ 8.5¢; Specials, 13¢ @ 20¢; Spring, 3¢ @ 4¢; Sheet, 7¢ @ 11¢; Bessemer Machinery, 2.7¢ @ 3¢; Open-Hearth Machinery, 3¢; Crucible Machinery, 5¢. One house reports such an unusually heavy demand upon its stock that an increased force has been employed in the warehouse. Prospects in this line continue extremely bright.

Steel Rails.—Local companies are constantly in receipt of inquiries for Rails, and

the demand shows no signs of abatement. The price here is about \$43 for such orders as can be taken, deliveries at makers' convenience.

Old Rails and Wheels.—Old Rails are somewhat easier in price, in sympathy with Eastern markets, and they are also in little better supply. Foreign T's could probably be delivered here at \$27 @ \$27.50, while for Domestic Rails \$28 is offered and \$2 asked, but no sales of any consequence are reported. Carload lots of Old Wheels have been sold at \$24, while several hundred tons have changed hands at \$23. Quotations for Wheels range from \$23 to \$23.50, with the demand greater than the supply.

Scrap.—Sales of a considerable quantity of Scrap have been made during the week, and prices are higher with an active search for material. Quotations are as follows, per ton of 2000 pounds: Railroad Shop or No. 1 Forge, \$28; Railroad Track, \$26.50; Leaf Steel, \$22; Coil Steel, \$21; Locomotive Tires, \$24.50; Cast Borings, \$12; Machine Turnings, \$14; Axle Turnings, \$16; Boiler Plate, \$18.50; Mill Iron or No. 1 Wrought, \$21; Sheet Iron or No. 2 Wrought, \$17; Machinery Cast, \$16.50; Stove Plate, \$13.50; Old Axes, \$30.

Nails.—A good demand is reported for small lots, but carload orders are not numerous. Prices have again been advanced by jobbers to correspond with the advance in the Western Nail Association's card, and they now quote \$2.65 for Iron and \$2.85 for Steel, with 10¢ off in carload lots. Manufacturers' agents quote about the same price, and report another advance expected at the Nail Association's meeting next week. As large orders are known to have been placed some time ago at much lower prices with manufacturers for delivery next month and later, conservative members of the trade are disposed to view these rapid advances with apprehension. A very active spring demand will of course absorb so many Nails that prices can be sustained, but if the demand should not be sufficiently great, then the supply in second hands will govern the price, and the card rate will either take a tumble or lose its force. Much will depend upon the developments of the next few weeks.

Barb Wire.—A very good demand is reported. At a meeting of the Board of Directors of the United Wire Company, held in this city on the 9th inst., a new schedule of prices was adopted as follows: 3.6¢ to jobbers, 3.75¢ in carload lots, 3.85¢ for less quantity of Painted, and 0.75¢ extra for Galvanized, for February delivery, f.o.b. St. Louis and Chicago delivery or its equivalent, to take effect immediately. Jobbers, however, continue to quote 3.75¢ for Painted, and 4.5¢ for Galvanized, with ¼¢ off for carload lots, but these quotations are made only for immediate acceptance and delivery, and the price is not guaranteed for 24 hours. The increased cost of Plain Wire and the active demand for Barb Wire, taken together, are keeping manufacturers in line, and prices are therefore being firmly held at the rates here quoted. These rates may not be further advanced immediately, but appearances indicate an advance of ¼¢ @ ½¢ by the 1st of April.

Hardware.—Jobbers report a continuance of the active demand with which this branch of trade has been favored for several weeks. Prices are unsettled, advances constantly occurring on many classes of goods. During the past week the prices of most kinds of Table Cutlery were marked up 50¢ per gross. Quotations were entirely withdrawn on Auger Bits. Rates on Chains were pushed up an average of ¼¢ per lb. on different sizes. Other changes are contemplated. Matters in this line are also being unsettled by the interstate commerce act, manufacturers of Hardware who formerly named prices delivered now quoting f.o.b. mills. This tends to make prices of some goods uncertain, and they will continue to be so until a thorough adjustment is made to the new order of things. Everything, however, seems to operate in the direction of stiffening prices.

Lead.—Prices have ranged from 4.25¢ @ 4.3¢, with sales of about 700 tons during the week. Holders are not disposed to name prices for future delivery.

The new furnace companies recently incorporated here to operate furnaces which they have leased in Wisconsin were organized during the past week as follows: The Milwaukee Furnace Company, operating Minerva Furnace on Coke, elected Charles Himrod, president; R. H. Lewis, vice-president, and W. H. Osborne, treasurer. The Wisconsin Furnace Company, operating Fond du Lac Furnace on Charcoal, elected William Deering, president, and Charles Ford, secretary. Messrs. Charles Himrod & Co. will sell the product of the former furnace and Messrs. Forsyth, Hyde & Co. the latter. Active preparations are being made to get both furnaces in blast. Other furnace projects are in contemplation.

Chattanooga.

Office of The Iron Age, Carter and Ninth Sts., CHATTANOOGA, TENN., February 14, 1887.

Business continues to be animated and merchants are having all they can do to keep up with orders and supplies. Operations in farming are just commencing, which naturally keeps a great many from visiting

the trade centers, and, as a matter of course, the retail trade has fallen off to some extent. Many coal and iron lands are changing hands at speculative prices, and many properties are changing hands that are located far from railroad conveniences, but lines are very soon projected and steps taken to construct the same.

Pig Iron.—So far there seems to be no lack of inquiries for Pig Iron, and the expressed wants of consumers seem to be much greater than the present production, but up to the present time there appears to be no advance in prices, although if consumers and speculators had had their own way prices would have been at the present time at least \$5 per ton higher than they are now. There are not those wanting who still predict that by the 1st of April the price of No. 1 Foundry will be \$30 per ton, and many others are of the opinion that it will go no higher, but remain as it is until some of the new furnaces that are being built will be blown in, when a decline must inevitably take place.

Miscellaneous.—Among the items of interest for the past week are the actual commencement of two coke furnaces by the Woodstock Iron Company. These will be the largest coke furnaces ever constructed in the South. It is the intention of the company to equip them throughout in the most thorough manner, with the latest and most improved machinery that can be got, with a view of the greatest economy of work and for its greatest results. The company recently formed at Gadsden, of which Mr. Lewis S. Colyar is the manager, have also commenced work, which will be pushed ahead as fast as an economic use of money can accomplish. There are to be two stacks. The one for coke will be 16 x 75, and the ores and coal in the immediate vicinity will be utilized. The one for charcoal will be 11 x 55. The fuel for the charcoal stack will be made in retorts, and all the bi-products will be utilized, which are expected to be of sufficient commercial value to more than pay the entire cost of getting the wood and manipulating the same.

Cincinnati.

CINCINNATI, February 14, 1887.

Pig Iron.—The past week has been a very quiet one at this point as far as actual business is concerned, and even the inquiries have been less numerous, and yet there are several large transactions on the point of consummation. Yet with all the dullness a firm tone has prevailed for standard brands of all kinds, and the few sales effected have been at full prices. The general impression is that the present lull is a godsend to the oversold furnaces and not against the interest of buyers; in fact, the consumers of Pig have evidently adopted this view and have acted upon their convictions. Any demand for Iron for immediate delivery goes unsatisfied—that is, for orders of any special magnitude. The furnaces strain themselves to assist buyers of small amounts, but when orders for 1000-ton lots seek placement, there is no Iron for sale for love or money. It is related that some few furnaces, which for reasons no doubt acceptable to themselves have been booking orders at a level under that conceived to be the general market, have so far secured places for their output that they have advanced prices and now stand as firmly as any on the list. It is this upon which some firms base their views of a stronger tone. The advance of prices of Iron in the East, and the higher freight rates to the West, it is stated, are attracting Iron from the Southern furnaces to the Atlantic seaboard, but there is very little Iron available for such movement, if reports are to be relied upon. Some "off" brands of Iron unexpectedly made, and some lots of unknown or uncertain reputation, have been sold at concessions, so rumor says, but the sales are claimed to have been made on the same "basis" as standard grades. The Central and Southern Ohio furnaces have as a rule withdrawn from the market. The return of the river to its ordinary channel has allowed business to return to a more normal condition, and the resumption of traffic by the railroads has made deliveries of Iron more satisfactory. One or two large sales of Bessemer and moderate amounts of Lake Superior Iron are awaiting consumption, but no round amounts of any kind are reported which would be of interest or importance. The prices of Pig Iron, as previously reported, are without essential change, and are about as follows for cash:

Charcoal Foundry	
Hanging Rock, No. 1	\$24.50 @ \$25.00
Hanging Rock, No. 2	23.50 @ 24.00
Southern No. 1	23.00 @ 24.00
Southern No. 2	22.00 @ 23.00
Coal and Coke Foundry	
Ohio Soft Stonecoal, No. 1	21.00 @ 22.00
Ohio Soft Stonecoal, No. 2	20.00 @ 21.00
Southern Coke, No. 1	22.00 @ 23.00
Southern Coke, No. 2	21.00 @ 22.00
Southern Coke, No. 3	20.00 @ 21.00
Ohio and West Pennsylvania Coke, No. 1	22.00 @ 23.00
Ohio and West Pennsylvania Coke, No. 2	20.50 @ 21.50
Forge	
Strong Neutral Coke	20.00 @ 20.75
Mottled	19.00 @ 19.50
Southern Coke	19.50 @ 20.50
Car-Wheel and Malleable Irons	
Southern Car-Wheel	27.00 @ 28.00
Hanging Rock, Cold Blast	27.00 @ 28.00
Hanging Rock, Warm Blast	24.50 @ 25.50
Lake Superior and Malleable	26.00 @ 27.00

Manufactured Iron.—The demand for Manufactured Iron has continued active and a firm tone has continued to prevail, but

prices have not been changed. We quote: Bar Iron, 2¢ @ 2.10¢; Charcoal Bar Iron, 3¢ @ 3.10¢; Sheet Iron, Boiled, Nos. 10 to 27, 2¼¢ @ 3¼¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3¼¢ @ 4¼¢ per lb.

Scrap.—The offerings are still light and the demand fair. Wrought Scrap is quotable at 1¢ @ 1.20¢, and Cast do., at 70¢ @ 75¢; Rails are scarce and saleable at \$28 @ \$30, and Wheels meet a moderate inquiry at \$21, but are held 50¢ @ \$1 per ton above this rate.

Nails.—The card rate has been advanced during the week by the Western Nail Association in session at this point to \$2 70 per keg for Steel, and the jobbing price has been the same, \$2.70 for Steel and \$2.50 for Iron, 10d. to 60d., and other sizes at proportionate rates.

Birmingham.

BIRMINGHAM, ALA., February 13, 1887.

In all the lines that the approach of spring affects business is very satisfactory throughout this region. Naturally enough, in view of the unparalleled growth of the place and its trade in the last year, orders by the jobbers of this city are especially free and full. Wherever speculative considerations enter at all the prevailing disposition among buyers is to fortify against a rise. The blockade of incoming freights has been very little relieved. What can be done when the rush of spring goods comes seems now a serious problem for the transportation authorities.

Pig Iron.—Although the demand is about the same that it has been for the last three months or so in volume, and hardly less urgent in tone, the upward movement seems to have been effectually arrested. As a rule, prices seem to be settling at about the average of the figures of the last few weeks, instead of constantly closing in toward the top, as they did all the fall and early winter from one week's reports to another. One concern, indeed, report prices equal to \$23 at New York for IX, but as a general thing sales do not realize as well as this. As for the volume of actual business, it may be stated that transactions are not numerous nor heavy. The product of this district still being almost inconsiderable as compared with the great bulk of Northern Irons, the check that bull speculations seem to have received in the Northern markets has scarcely any effect here. No matter what the state of the market at large may be, the Iron that leaves here is almost entirely for actual and early use.

Finished Iron.—Although not quotably higher, Finished Iron apparently is very much more apt to advance again very soon than is Pig Iron. The significance of transactions and of inquiry is wholly bullish.

Nails.—are still about the liveliest thing in the whole Iron list. A slight advance is reported again by all large handlers, though quotations are a little irregular. The latest figures, which, as usual, are the highest, are \$3.07½ for Steel and \$2.87½ for Iron.

Miscellaneous.—Orders continue to be very full and imperative for Bolts and Nuts, Washers, Reaping, Structural articles and small castings generally. In the line last mentioned prices have been realized in one or two cases that were pronounced quite unreasonable a very little while ago.

Coal and Coke.—Coal of all kinds is still scarce. Prices have not been advanced as a general thing, however. Nearly all the furnaces are slack of Coke, the output of some of them being even considerably curtailed by the sparing use of the fuel. There are several new Coal and Coke overtures of some consequence in the air. One, bearing the ambitious charter style of Alabama Connellville Coal and Coke Company, expects to take a Coal at the near edge of the Cahaba field, in which there have been none but tentative operations in this line heretofore.

Cleveland.

CLEVELAND, February 14, 1887.

Iron Ore.—The best informed dealers believe that nearly 2,000,000 tons of Ore have been sold to the furnaces thus far during the winter, and estimate the total output of the Lake Superior district for 1887 at 4,250,000 tons. Furnacemen say they will use from 400,000 to 600,000 more tons of Ore this year than last. These figures give an idea of the activity in the market. Three-fifths of the shipments from the Lake Superior region will come to Cleveland, and this city is as essentially the center of the Iron Ore market as Wall street, New York, is of the financial market. There is no change in the quotations furnished last week, although sales have been more brisk. A number of substantial blocks of Ore have been sold during the week, one furnace reporting the purchase of 110,000 tons of Bessemer Ore. It is said, however, that the bulk of last week's sales was in small lots. In this way the trade has moved along very satisfactorily, more than meeting the expectations of the companies. The most important matter, however, has been the chartering of vessels for Ore transportation. During the past seven days, it is believed, a very large share of the contracting for 1887 has been done. The vessel men have made substantially the concessions anticipated by The Iron Age. Trip engagements from Escanaba up to about October 1 have

been made at \$1.35 and season charters for \$1.40. From Marquette trip contracts have been closed which will keep the vessels busy up to November 1 at \$1.65. Eight trip engagements from Ashland at \$1.85 have been made. Vessel owners say that the latter agreement is as good as a \$2 rate for the season from Ashland and Two Harbors, inasmuch as \$3 and more per ton can be realized after this contract has been completed. Shippers do not look at the matter in this light. They argue that eight trips from Ashland is a fair season's business, and that the charters are practically for the season. The virtual adjustment of differences as to transportation rates accounts for the unusual activity in the market. For No. 1 Specular and Magnetic Bessemer Ore the quotations are \$6.25 @ \$7.75; Red Hematites, Bessemer quality, \$5.50 @ \$6; Menominee Range Bessemer Ores, \$5.50 @ \$6; Gogebic Range Bessemer, \$5.50 @ \$6.

Pig Iron.—The market is remarkably firm, and if there is any change whatever in quotations it is toward even higher prices. A prominent furnaceman returns a note sent him for information regarding the status of the market indorsed: "The demand is extraordinary. There is a noticeable stiffening in quotations for Charcoal Irons. The activity in the Pig Iron market is due to the enormous amount of car building now going on. Not less than 60,000 cars are in process of construction, and an immense quantity of Iron must be had. There are no indications of a break in the market." Other dealers confirmed this statement. There is still a scarcity of Coke. This serves to annoy the producers greatly. Still sales have been very brisk for the past week, and promise to continue so.

Old Rails.—The market fails to rally from the effects produced by the influx of foreign Rails. Sales have been made during the week at \$27.75.

St. Louis.

ROGERS, BROWN & Co., St. Louis, W. H. SHIELDS, manager, report as follows, under date of February 14, 1887: Inquiries during the week have been plentiful and a good average business transacted without change in prices. The activity of the manufacturing interests at this point can hardly be appreciated until a person has made the rounds and observed its evidences at every step. If some unforeseen cause does not interfere St. Louis may expect a prosperous year's business and an especially heavy consumption of Iron. This activity is particularly noticeable in everything having to do with railway supplies. The greatest difficulty the trade is now experiencing is to get deliveries forward as fast as required upon orders already taken. A number of large consumers here have their wants covered for the next six months, but there is a large majority which may be expected to enter the market within the next 60 days. It is hoped the supply will be more abundant than now when that time comes. Cars in the Connellville district being more abundant, have made receipts of Coke more liberal and greatly eased up the stringency for foundry fuel. We quote Pig Iron prices, f.o.b. St. Louis, as follows:

Charcoal Foundry	
Missouri	\$22.00 @ \$23.00
Southern	22.00 @ 23.00
Coal and Coke Foundry	
Southern, No. 1	22.50 @ 23.50
Southern, No. 2	22.00 @ 22.50
Ohio Softeners	22.00 @ 23.00
Mill Irons	
Missouri	21.00 @ 21.50
Southern, No. 1	21.00 @ 21.50
Southern, No. 2	20.50 @ 21.00
Car-Wheel and Malleable Irons	
Southern	24.00 @ 25.00
Lake Superior	25.00 @ 27.00
Scrap, etc.	
Old Car Wheels	21.00 @ 22.00
Old Rails	20.00 @ 21.00
Connellville Coke (Frick's)	6.50

Detroit.

DETROIT, MICH., February 14, 1887.

Prices continue to stiffen all the time, and particularly may this be said of Lake Superior Charcoal Iron. An examination of the stocks on hand unsold shows a tremendous falling off in the visible supply of this metal. Added to this, an examination of the production of Malleable concerns alone, to say nothing of the immense Car-Wheel industry, shows that the demand is going to be almost 50% greater than at any other time in the history of the trade. This is largely owing to the immense amount of Malleable Iron required for railway equipment, as all new specifications on cars alone show that Malleable Iron must be used in place of Wrought and Cast as heretofore. We think that the Charcoal Iron required for Steel Rails is going to be a very limited quantity. We have only heard of three specifications for any quantity of Rails where Charcoal Bessemer was a necessary and specified component. There seems to be a great scarcity of Silvery Irons, although we learn of one or two large sales having been made for summer delivery. They all say they can deliver no large quantities for immediate use. Although advances have been made on the different grades all along the line, we think a repetition of our last week's prices will cover the ground.

Lake Superior Charcoal, all numbers	
Lake Superior Coke, All Ore	\$25.00 @ \$26.00
Lake Superior Coke, Cinder Mixed	22.00 @ 23.00
Standard Ohio Blackbands	22.50 @ 23.50
Southern No. 2	22.50 @ 23.00
Southern Silvery	22.00 @ 23.00
American Old Iron Rails	20.00 @ 21.00
Old Wheels	20.00 @ 21.00

Mr. John Birkinbine, secretary of the Charcoal Ironworkers' Association, announces that the office of the association is removed to No. 25 North East City Hall Square, Philadelphia, where communications should now be addressed.

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Trade Report.

General Hardware.

Since our last issue there have been comparatively few important changes in the prices of Hardware, and the market has the same general features as at our last review. A very satisfactory demand from the retail trade is reported. Prices continue strong, with an upward tendency in some lines.

RARE WIRE.

The market is without special change since our last report. Prices are firm, with an upward tendency and fair activity. Four-Point Galvanized is held at 4 1/2¢ in carload lots.

NAILS.

At a meeting of the Eastern Nail Association last Thursday it was decided to make no change in the card rate, which remains at \$2.40. The market is quiet, largely because the season is unfavorable to the movement of Nails throughout the country, so that buying to replenish depleted stock has not yet begun. We quote \$2.40 for carload lots on dock, and \$2.45 @ \$2.50 for small lots from store.

MISCELLANEOUS PRICES.

In a circular dated February 10, the American Screw Company, Providence, R. I., announce the change in Bay State and Philadelphia Tire Bolts to which we alluded last week, making the discount on the Bay State 65 and 10 per cent., and on the Philadelphia, 82 1/2 per cent. There is a change also in Thousand Rivets, the discount of which is made to be 60 instead of 65 per cent., as noted below.

With the changes that have recently taken place in the market for Table Cutlery, a better feeling is perceptible, and it is thought probable that there will be more regularity in prices, owing to the diminished competition and a better understanding among the manufacturers.

The negotiations among the manufacturers of Tinware, to which we referred in a recent issue, are not yet concluded, but it is regarded as probable that such an arrangement will be consummated as will put this line in a more satisfactory condition than it has been in for a long time, owing to an understanding which it is expected will be reached among all the manufacturers, so that they will work together with more harmony than heretofore. While the object of this movement is not the forcing of prices to higher figures, it is probable that after the arrangements are completed there will be something of an advance in prices, as the existing quotations, which are already slightly advanced beyond those recently ruling, are still referred to as unreasonably low.

The market for Snaths and Cradles, which has been irregular and low for some time, gives indications of improvement. Some of the largest manufacturers are withdrawing extreme discounts and announcing higher prices, and it appears probable that this line of goods will soon be in a more satisfactory condition.

The Port Chester Bolt and Nut Company, under date February 10, issue the following revised quotations, stating that their Nut lists are those adopted by the association December 9, 1886, and which went into effect January 1, 1887:

Empire Tire Bolts, list Feb. '88 dis. 65 & 10 %
Philadelphia Tire Bolts, list Oct. '86 dis. 82 1/2 %
Keystone Phila. Tire Bolts, list Oct. '84 dis. 80 %
Norway Phila. Tire Bolts, list Oct. '84 dis. 75 & 10 %
Sleigh Shoe Bolts, list Oct. '84 dis. 75 & 10 %
C. and T. Hexagon Nuts, U. S. Sizes, 4 to 4.5 off list.
Plain Square Nuts, U. S. Sizes, 4 to 4.5 off list.
Plain Hexagon Nuts, U. S. Sizes, 4 to 4.5 off list.
Plain Hexagon Nuts, Mfrs. Sizes, 4 to 4.5 off list.
Plain Hexagon Nuts, Mfrs. Sizes, 4 to 4.5 off list.

The Miller Lock Company, Philadelphia, Pa., are making 40 per cent. discount on their Champion Padlocks, instead of 33 1/2, as heretofore. They state that the demand for the goods, and increased facilities for their manufacture, enable them thus to reduce the price, which they refer to as exceptionally low for such goods. They also call attention to important improvements in the finish of the goods which have recently been made.

The new list for Hammers is being used by the manufacturers who adopted it, and it is regarded as well arranged, and serving the convenience of both merchants and manufacturers. Prices are referred to as well maintained and pretty regular, notwithstanding the fact that there is no agreement among the manufacturers in regard to them.

The File market gives continued indications of increasing strength, and some of the manufacturers, and among them some of the leading concerns, are quoting considerably higher prices than they have recently been making, and nearly all the extreme quotations have been withdrawn by the manufacturers of goods of approved quality. The condition of the Steel market is referred to as not only necessitating the advances which have thus far taken place, but as likely to require the announcement of still higher figures when it is necessary to replenish stocks of Steel.

Still another advance has been made in Trace Chains, and the market is firm at the new prices. Some styles of Fancy Chains are also slightly higher.

The market for Tackle Blocks is characterized by more regularity than it has recently possessed, and higher quotations are made by the manufacturers.

The associated manufacturers of Cabinet Locks have made the advance in their prices to which we have before alluded as likely to be announced. The discount is now 33 1/2 per cent., with an additional 2 per cent. for cash.

Cheap Door Locks are firmer and held at slightly higher prices. The outside manufacturers are withdrawing some of their extreme quotations and the associated makers are refusing to sell at as low net prices as heretofore. The new discount of 55 and 5 per cent. is regarded as pretty well maintained, but there are indications of some irregularities. The jobbers in many cases are selling at a base discount of 60 per cent.

There is no material change in the price of Wire Nails, which have not responded satisfactorily to the improved tone of the Wire market.

The discount of 65 per cent. on Thousand Rivets has been withdrawn and the uniform discount of 60 per cent. on the line of Iron Rivets and Burrs is to be noted. The market for these goods is regarded as in a more satisfactory state than it has been for some time, and the hope is expressed that the present prices may be maintained.

The manufacturers of Steel and Iron Squares have been in conference with a view to reaching a better understanding. The result has not been any material change in price, but a slight improvement in the tone of the market is noticeable. It is expected that another meeting will be held before long.

The existing arrangements between the manufacturers of Enamelled and Tinned Hollow-ware are regarded as working very satisfactorily, and with the present condition of the market and the increased cost of manufacture it is considered not unlikely that an advance in price may be made before long.

The demand for Tacks is referred to as only moderate, and the manufacturers are not receiving much better prices for their goods. They are, however, showing a disposition to hold the goods firmly, the cost of manufacture not justifying any concessions.

The Snell Mfg. Company, Fiskdale, Mass., and 30 Chambers street, New York, are about issuing an addition to their catalogue, relating to Machine Bits, Hub Augurs, and Mortising Chisels. The Machine Bits and Hub Augurs are listed by the dozen, and will so be sold hereafter, instead of, as heretofore, by the quarter. This change will be noted with satisfaction by the trade as serving their convenience. The discount on the Machine Bits and Hub Augurs is 25 and 10 per cent.; the Mortising Chisels are quoted at net prices. These tools are described as made with especial care from refined cast steel, tempered in oil, and fully warranted.

The following are the revised prices of some of the Silver Plated Steel Knives, &c., manufactured by the William Rogers Mfg. Company, Hartford, Conn., to which we referred in our last issue:

No. 12 Med. Knives and Forks, Plain	50 doz. at one time	
or Satin, per doz. net	\$3.10	\$2.95
No. 12 Dess. Knives and Forks, Plain	50 doz. at one time	
or Satin, per doz. net	2.95	2.80
No. 12 Solid Steel Butter Knives	50 doz. at one time	
Plain or Satin, per doz. net	3.10	2.95
No. 12 Table Fruit Knives, Plain or	25 doz. at one time	
Satin, per doz. net	2.15	2.00
No. 12 Solid Steel Nut Picks, Plain or	25 doz. at one time	
Satin, per doz. net	2.15	2.00
R. C. Co. A. 1 Med. Knives and	50 doz. at one time	
Forks, Plain or Satin, per doz. net	2.00	1.85
R. C. Co. A. 1 Dess. Knives and	50 doz. at one time	
Forks, Plain or Satin, per doz. net	1.85	1.70
No. 12 Solid Steel Nut Cracks, No. 1,	4 doz. at one time	
per doz. net	3.10	2.95
No. 12 Solid Steel Nut Cracks, No. 2,	4 doz. at one time	
per doz. net	6.00	5.75
Arabesque Handles, 25 cents per dozen extra;		
Arabesque and Old Silver Handles, 50 cents per		
dozen extra; Swaged Knives, 10 cents per dozen		
extra; Cimeter and Swaged Knives, 20 cents per		
dozen extra; No. 16 Dessert Knives, 50 cents per		
dozen extra; No. 16 Dessert Knives, 50 cents per		
dozen extra.		

The Nimick & Brittan Mfg. Co., Pittsburgh, Pa., issue a circular giving the recent revisions in the list prices of some of their Locks, and announcing the change of discount to 55 and 5 per cent.

The following are the prices of the different articles of Indurated Fibre Ware manufactured by the Indurated Fibre Company, Lockport, N. Y.:

Weavers', or Half Pails, 6 quart.	Per dozen	\$3.50
Star Pails, (Fire Pails this size also), 12 quart.		4.00
Milk-Pails (larger than Star), 14 quart.		5.00
Stable-Pails (dual bottom), 14 quart.		5.00
Keelers' (plain), 6 quart.		2.50
Keelers' (with handles), 6 quart.		2.75
Milk-Pans, 10 quart.		2.50
Wash-Basins, 11 1/4 inch.		1.75
Wash-Basins, 13 1/4 inch.		2.00
Washtubs, 19 1/4 inch.		14.00
Washtubs, 20 1/4 inch.		16.00
Cuspidors		4.50

In a circular announcing these prices attention is called to the fact that this Ware is molded or pressed out in one piece, from wood fiber produced by grinding into pulp white spruce logs, and reference is made to the advantages possessed by the Ware.

The Mallory - Wheeler Company, New Haven, Conn., and 64 Reade street, New York, have issued a circular stating that on all goods on their list, except Padlocks and Padlock Keys, the discount is 55 and 5 per cent. Padlocks and Padlock Keys are subject to a discount of 70 per cent., purchasers

of 50 dozen being given an extra 5 per cent. They also issue the new list prices of February 2 on certain Locks and Knobs, to which we alluded in our last issue. New Door Knobs added to their variety February 2 are also described, with list prices.

An advance has been made in Paper Shells which are now held at discount 15 per cent., the Star Brand being discount 25 per cent., with the usual 2 per cent. for cash.

Another advance has been made in Wrought-Iron Pipe, the discount being diminished 2 1/2 per cent. The small sizes are quoted at discount 32 1/2 per cent. in small lots, instead of 35 per cent., as heretofore, and a corresponding change is made in the other discounts. Some changes are also made in list prices.

ITEMS.

The Stevens & Brace Iron Company will remove their stock of Heavy Hardware from Leavenworth, Kan., to Kansas City, Mo., on the 1st of March. They have been located 15 years at Leavenworth, but the superior advantages of Kansas City have induced them to make this transfer of their business.

The Ross & Fuller Association, 33 Chambers street, New York, have been appointed representatives in the West and South of the Palmer Mfg. Company, Troy, N. Y., for the sale of Palmer's Common Sense Frame Pulley.

The Russell & Erwin Mfg. Company, New Britain, Conn., and 43, 45 and 47 Chambers street, New York, have issued a new descriptive catalogue and price list of Hardware, which is designated as Volume VII., 1887. It is an imposing volume of more than 1000 pages, 600 of which are devoted to goods of their own manufacture, and the remainder to an exhibit of a varied line of general Hardware. Comparing it with their former volume, which was issued in 1882, it is observed that the new catalogue contains about 150 more pages, nearly 100 of which are devoted to their own goods of which the complete line, including recent additions, is thus represented. The catalogue opens with a new and very satisfactory view of their works at New Britain. The circular issued to the Hardware trade in their price list of 1853 is reprinted as a preface, with the remark that it is as applicable to-day as it has been for the past 33 years. The catalogue is fully illustrated with many superior cuts, and is compactly arranged so as to represent satisfactorily and in convenient form the exceptionally complete line of goods to which it is devoted. It is accompanied by a discount sheet in which prices are revised up to February 2.

S. H. Wing, who has for some years been prominently connected with the Horse Nail business and is widely known to the trade, is now the manager of the Metropolitan Wire Nail Mfg. Company 312 and 314 East Twenty-second street, New York. This company are manufacturers of a line of Steel, Iron and Brass Wire Nails, Escutcheon Pins, &c.

The Western demand for Wire Cloth is exceptionally large. Henry Butman, Chicago agent for the Clinton Wire Cloth Company, reports their sales for this year as unprecedented. Stocks of Cloth in the hands of manufacturers are pretty well sold up, and prices are ruling higher. Screen-door manufacturers are now giving preference to Cloth of good quality. A large business is also being done in Silver Finish Galvanized Netting.

The death of Samuel Waddell, senior member of the firm of Samuel Waddell & Co., Montreal, is announced, and the unexpected intelligence is received by his many friends with much regret. Mr. Waddell, a native of England, came to Canada in 1851, when he engaged in the Hardware business at London, and after two years came to this city, where he entered the service of Bliven, Mead & Co. Having thus learned the Hardware business, and desiring to settle in Montreal, he made an engagement with Anderson, Evans & Evans, which gave him familiarity with the trade of Canada. He was subsequently with Frothingham & Workman, and retiring from that house in 1864 he formed a copartnership with Mr. Pierce, under the name and style of Waddell & Pierce, which was dissolved in 1868. Since that date the firm has been under the style of S. Waddell & Co. For many years Mr. Waddell was prominently identified with the business interests of Montreal, and with the iron trade of Canada, having represented many of the most extensive establishments manufacturing of Rails and Railway Supplies. His career is referred to as most successful, financially and otherwise, and the tributes which are paid to his character indicate the affection and esteem in which he was held. His illness was comparatively brief, and the announcement of his death came with a surprise to the most of his friends.

Announcement is made, Syracuse, February 5, by the Moore & Barnes Mfg. Company, that they have purchased from Hayden & Barnes the machinery, tools, and patterns for manufacturing the Colton Vices, together with their exclusive rights under the patent. The company will continue the manufacture of these goods, and extend the line as rapidly as possible. After May 1 they will occupy their new factory at Phoenix, N. Y., which will give them increased facilities; but until then they retain

the present manufactory and office in Syracuse. They have opened an office and salesroom at 112 Chambers street, New York, where they will carry a full stock and to which orders or inquiries may be addressed.

The Grand Rapids Refrigerator Company, Grand Rapids, Mich., have issued their illustrated catalogue and price list for the season of 1887, in which they display the line of the Leonard Dry Air Refrigerators and Creameries, of which they are manufacturers. The special features of these goods are fully explained, with illustrations showing the details of construction upon which they lay emphasis. A large variety of patterns are made, and a number of testimonials are given in regard to the merits of the goods. The pamphlet is attractively printed.

The Chicago Stamping Company, Chicago, Ill., have just issued their 1887 catalogue of Bird Cages, Toilet-Ware, Water Coolers, Ice-Cream Freezers, Refrigerators, &c. It is a very finely printed pamphlet, with satisfactory illustrations of the goods to which it relates.

The National Horse Nail Company, Vergennes, Vt., issue an attractive calendar calling attention to the Champlain Horse Nails, of which they are manufacturers, some of the different styles of the Nails being illustrated.

The Rockford Plow Company, Rockford, Ill., in their spring circular, 1887, describe the line of Rockford Plows which they are manufacturing, calling attention to the recent change in the name of the company. Besides Plows, the pamphlet illustrates Planters, Cultivators, and other Agricultural machines.

WHAT THE TRADE SAY.

The following careful review of the situation, with a special reference to some of the principal factors, which in the judgment of our correspondent are to be observed in the present improved state of the market, was written nearly a month ago, but is still applicable in most of its expressions to the present time:

The present advancing tendency of the market has none of the elements of the old "boom" about it. It is above suspicion, it starts from the base, is legitimate and reasonable, devoid of all speculation, and is backed by a steady and increasing consumption. It is natural, with the facts before them, that buyers should seek to anticipate their requirements by placing orders for reasonable amounts of goods, to secure them at lower rates than they consider they might have to pay later on. Of late there has been somewhat more than a disposition, amounting almost to anxiety, to secure favorable contracts in this way. The various lines of goods composing what is termed Shelf Hardware have been scanned and considered closely. Those most liable to be affected by an advance of the raw material have received first attention, followed closely by those goods the price of which (through excessive competition, overproduction, &c.) had become abnormally low. These purchases are lending their aid in stimulating the market. Several leading lines of Hardware, as noted weekly in your columns, have already advanced quite a respectable percentage, and are held firmly at the advance. It is without question, and generally conceded, that a large number of other lines must soon follow in their wake, especially if the raw material continues to advance. Among the prime factors that have brought about this improved condition of the Iron market, we regard the railroads of the country as the heaviest purchasers, and therefore the most potent influence bearing on the consumption of Iron and Steel. The presence of the Government in the market as a consumer of Metal, coupled with large and extensive schemes for the manufacture of Iron and Steel War Ships, Ordnance, &c., we think has more direct influence on the Iron market than ordinarily supposed. The general condition of trade throughout the country outside of our specialty, Hardware, exhibits a very prosperous and flourishing *tout ensemble*, especially so far as the West and Northwest are concerned. The situation therefore shows decided and unmistakable signs of encouragement, and in our opinion will continue to develop in the same direction. There is a possibility, of course, of a reaction at any time from the slight advances already recorded, but we see no probability of such an occurrence.

The following letter from Roberts, Hardwicke & Taylor, Sherman, Texas, who mention that they sell the goods of the Iowa Farming Tool Company, will be of interest as relating to the movement of trade in that section:

To give your many readers an idea of the development of our section of country, permit us to say that our first shipment of Handled Hoes to our trade was made yesterday, and consisted of over 700 dozen, leaving booked already sold 200 dozen. Our entire sales for the season will not fall much short, if any, of 2000 dozen, being the amount of our factory purchase.

The Wells & Nellogar Company, Chicago, Ill., issue a price current of reasonable goods, in which a variety of Agricultural Implements, specialties and staple goods are represented. It is introduced by the following comments on trade:

In our last circular we recommended buyers to keep full stock, as the indications were that the time had come when there would be no further decline, and every probability of an upward turn in prices, which turn has actually taken place, and while as yet few advances have been made except in the more staple lines, and they are not high, we predict that during the next few months nearly every article in our line will be effected by the present unprecedented

demand for steel and iron. *Hardware.*—We never have had the year start off with such a demand for Hardware as the present one, and from information gathered from all parts of the country we learn that there is to be more building than for many years. Last season the labor difficulty upset matters very seriously just at the beginning of the contracting season, but this year it is not generally thought that we will have a repetition of those troubles. *Barbed Wire.*—At the last meeting of the manufacturers, held a few days since, prices were advanced to conform with the present cost of Plain Wire. We are holding our prices lower than we can replace the Wire, and are of the opinion that on the opening of spring, Wire will reach 4 cents. *Nails.*—are in good demand. Were advanced, February 1, 5 cents per keg to conform with the advance in freight which took place then. There will be a meeting of Nail manufacturers on the 9th, at which time we look for higher prices.

We have the following letter from a Western correspondent, who refers to the dangers of merchants buying in anticipation of a boom. In a time like the present, when some goods have advanced, it will be well for the trade to consider the cautions given:

We have had our periods of booms and have noticed how disastrous they have been to the manufacturers, and at times to the dealers. The merchant of moderate means buys to the extent of his credit, and very often strains it, and instead of the brilliant stroke that he imagines he has made, he has bought a stock in excess of his wants, and in excess of his ability to dispose of, while this over-buying by all classes has created an undue and feverish demand for goods, leading manufacturers to increase their manufacturing capacities to such an extent that the market is soon flooded with goods. In a short time people realize that there is going to be no famine of goods, and as soon as they are awakened to a realizing sense of this fact, then every one wants to sell. In one or two short years more harm can thus be done than can be cured in the following five years. There is the readjustment of mechanics' wages to follow with the decline, and the very obstinate fight to be made with mechanics, as well as other difficult problems to contend with, in getting prices back to a sober-day scale. I think the more uniform prices can be kept, the better for all parties. Of course it is the province of a trade journal to chronicle all matters that effect the interests of that trade, and you no doubt would be censured by your patrons if you did not. However, I believe that the less that can be said at such a time as the present that is calculated to influence would be speculators, the better.

The following letter from a Hardwareman refers to the condition of business, and alludes, it will be observed, more especially to certain matters in connection with the Stove and Tinware trade:

Why should not stove men advertise a reduction in heating stoves at the end of the season, and not carry over stock of this description? Dry goods merchants make drives on cloaks at the end of each season, and close out their stock of them. An interesting fact, interesting in more points than one, presented itself in my store to-day. I have been almost sure for some time that my galvanized coal-oil can leaked, so to-day had the boys draw off the oil to see. It has been sitting in an unchanged position for six years or more. Upon removing it from the platform we found there were two boards it rested on with a 3 inch opening between them. Across the can, in an exact line with the opening, was a row of corrosions, almost through, through which the oil had penetrated. Had the person that made the platform been more liberal with his lumber the dampness (which I suppose was the cause) would not have eaten through, and cost me dollars' worth of oil. If the dampness striking against the unprotected part of the bottom was not the cause of the damage, what was?

In taking an inventory of stock it is correct to price goods at ruling prices at that time, or to price them from the latest bills of each kind or class of goods that have been bought? I ask this question to settle a difference of opinion on the subject. Though traveling men do not report an extremely large business, they say every one seems good-natured and hopeful of better times and of a more permanent character than has left its impress on the past few years.

A Hardware house in the South allude in the following letter, to what they consider an unfair interference with their business on the part of a jobbing house:

I am glad to see I have one friend out West who is a kicker like myself on the jobber or manufacturer selling to Tom, Dick and Harry, and giving us retailers the go by. Here is another case to the same point: One of our customers came to us for Wire Cloth. He wanted a pretty good lot, and to get his trade we offered it at 1/4¢ advance above cost. Instead of buying of us, he sent direct to the jobbers, bought at the same price that we could, and then brought the jobber's invoice to us, shook it in our face and laughed at us. Dear Iron Age, do you think under such circumstances that we should not be kickers? We can furnish names in the above case. KICKER.

HARDWARE IN EGYPT.

The correspondent of one of our exchanges writes from Cairo as follows, describing the condition of the Hardware market in Egypt, with a special reference to the class of goods there sold:

"I will take this opportunity of telling you that English capitalists and merchants are exhibiting a sad want of enterprise in not doing something to set up in Egypt an establishment for the sale of English Cutlery. Hardware, Ironmongery, kitchen utensils, workmen's tools and all such things as the English excel in. At present Egypt is supplied with Cutlery by Germany, carpenters' tools by Italy and Germany, the greater part of them of the most worthless descrip-

Barb Wire.—There is lively call for this article, but mainly anticipatory, as the heavy rains and floods of the Mississippi and tributaries have gone to prevent anything like the amount of fence erection that will be necessary later.

MECHANICAL.

Rohn's Piston-Rod Packing.

We show on this page two engravings of a new piston-rod packing brought out by Mr. Christian Rohn, 343 Washington street, Newark, N. J.

The primary object in the design of this packing was to provide a packing for piston-rods, which will be perfectly air and gas-tight at all times, and which will be hermetically sealed under all pressure of the

its foot is a conical hood, beneath which works a rotary excavating plow 8 feet in diameter. The suction is produced by a powerful centrifugal pump, run by a 200 horse-power engine. The discharge pipe is 20 inches in diameter, has rubber-hose joint connections, and is carried to the shore on pontoons. The material was mixed with from 3 to 10 times its volume of water and discharged at distances up to 3500 feet from the dredge, and at from 6 to 10 feet above water. A year's record shows an average of 175 cubic yards per working hour, and

on the above subject by Mr. E. Kötting, of Hanover, Germany. Mr. Kötting's aim was to treat the matter from the practical side, and to see what can be done to aid the engineer in constructing an engine which will obtain from the gas used the maximum of efficiency—not only the highest indicated efficiency, but the highest available work. Every engineer knows that the greatest useful effect is produced in an expansion steam engine by allowing the steam to be suddenly admitted at the dead-point and suddenly cut off when admitted without

patent, he speedily discovered his mistake, and all his engines are so constructed as to avoid stratifying; they use, in fact, a uniformly diluted charge, which is really the best in practical work. Experiments made on Kötting's engine, by igniting at four different positions, prove the mixture to be homogeneous and ignitable at any point; the diagram is practically the same from all. It was found, also, that high piston speed gave the best diagram, and that little effect was produced by changing the direction of the inlet port.

The Wade Valve.

The Frontier Iron and Brass Works, of Detroit, Mich., are now putting on the market a new and ingeniously arranged combined check and globe valve, designed by Mr. William Wade. The two engravings which we give on this page represent vertical sections and clearly show its arrangement.

It will be noticed that in some respects the design is similar to the ordinary well known form, there being a valve-case, A, with the usual partition, B, and also a stuffing-box and hand wheel. The upper portion of the valve stem D is, as usual, round where it passes through the stuffing-box, and a screw-thread, e, is cut on the stem within the cage H, to reciprocate the stem when turned. Below the stuffing box and above the screw-thread e a nut, K, encircles the stem and rests against the lower side of a shoulder formed in the cage H. This nut, or rather collar, K is so connected with the stem that it not only turns with it, but also slides along its length. The construction shown to attain this result is to square a portion of the stem, as shown at d, and to square the collar K to fit the stem.

The nut L, Fig. 2, engages with the thread e on the stem D, and is made to fit loosely within the cage H, so that it can turn freely. Its upper surface is in contact, when in position, with the under surface of the collar K, so that the rotation of the collar with the stem D will rotate the nut L by friction. The valve proper F is so attached to the end of the stem D that it

Forced Draft for Marine Boilers.

Engineering records some material progress is being made in the application of the system of forced draft in the British mercantile marine. Especially is this true, we are told, as regards the engineering practice on the Clyde. The screw steamer Ohio, belonging to the International Navigation Company (now amalgamated with the new Inman Company), and engaged in the Liverpool and New York mail and passenger trade, has lately arrived in the Clyde for the purpose of being entirely refitted with new engines and boilers by Messrs. James Howden & Co., of Glasgow, the boilers to be worked on the forced-draft system, which was successfully brought into operation by that firm upward of three years ago. The important advantages of that system have been amply demonstrated by continuous working on long voyages during the greater part of that period. The steamer New York City, one of the "Direct" West India Liners, was fitted with a new boiler on the "Howden" forced draft system in the autumn of 1884, and she has been running continuously since then with the utmost efficiency and with an economy in fuel which is believed to be the highest yet attained in any steamer afloat, though the engines are only of the ordinary compound type, with the boiler pressure only 80 pounds. This system of working marine boilers increases the propelling power of the engines, while it admits of the weight of the machinery being reduced, as also the amount of space occupied by it, thus adding to the cargo-carrying space. It also gives very great economy in fuel. These advantages are now being practically recognized by some of the leading and most conservative shipowning companies.

The Ohio is the first of the steamships belonging to the International Company to be refitted according to the most recent notions in marine engineering practice; and in order that she may have the fullest benefit of the forced-draft system, she is also being supplied with new triple-expansion engines. Messrs. Howden & Co. are just finishing the refitting of the steamer City of Venice with

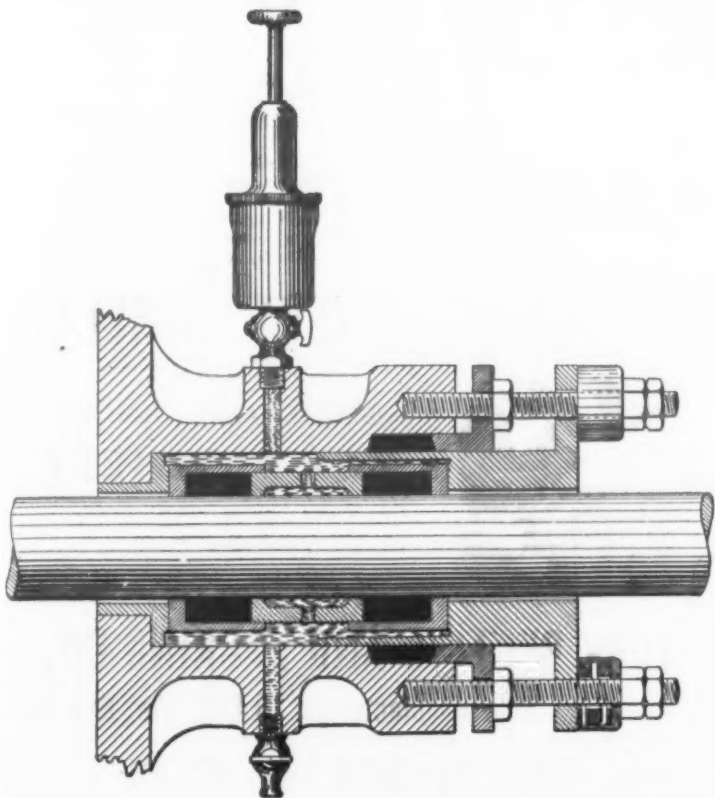


Fig. 1.—Longitudinal Section.

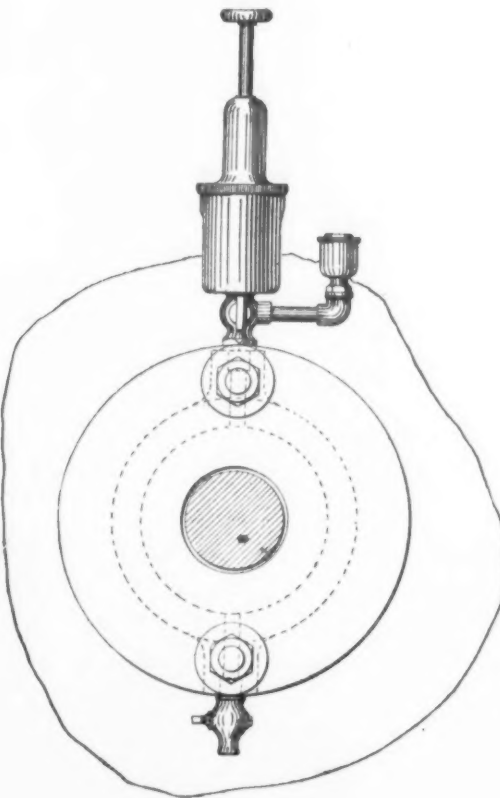


Fig. 2.—End View.

ROHN'S IMPROVED PISTON ROD PACKING.

gas or other fluid, the piston-rod being capable of its proper reciprocating movements with the least possible friction and wear upon the parts, and, at the same time, be capable of a limited movement or play laterally. A further object was to provide means for automatically taking up the wear upon the packings around the piston-rod.

To this end the main gland, as shown in Fig. 1, is surrounded by a packing of any approved class, the stuffing-box being for that purpose furnished with a suitable recess or enlargement at its outer extremity. The main gland is provided with an enlarged chamber at its inner end, and the inner wall of this chamber is ground, water and air-tight. A sleeve is, moreover, fitted around the piston-rod, and is located centrally within the chamber of the stuffing-box. The inside diameter of this sleeve is a little larger than the diameter of the piston-rod, so as to leave a small space between the rod and sleeve, the latter, further, being provided near its middle portion with a number of holes. Special boxes are arranged at opposite ends of the sleeve for the packing proper for the piston-rod, the sleeve bearing against each packing. The inner box, it will be noticed, bears also against a bushing at the bottom of the stuffing-box, the bearing surfaces in this case also being ground. The holes for the piston-rod in the bushing and main gland are made sufficiently larger than the piston-rod, say from $\frac{1}{16}$ to $\frac{1}{8}$ inch, to allow plenty of room for play. From this arrangement it can be seen that as the main gland is forced inward the packings in the boxes will be tightened round and bear with equal pressure on the rod, and at the same time have perfect freedom to slide on the ground faces between which it is held with any side movements of the rod. Connected to the stuffing-box is a reservoir containing a fluid forced downward by means of a piston and helical spring. This reservoir can be situated on top of the stuffing-box as shown, or in any more convenient place, and can be connected to the stuffing-box by a pipe. If it is desired to cool off the piston-rod and packing, the stuffing-box can be connected to a water-pipe or any more suitable reservoir, and water or fluid under pressure can be circulated through it.

To fill the reservoir, as shown in illustration, the fluid is poured into the smaller cup and drawn into the reservoir by suction by lifting the piston with the small hand-wheel. As a fluid, say, oil is more easily prevented from escape than air, gas or steam under heavy pressure by packing. The amount of packing in the boxes need not be very deep; it also does not require to be tightly compressed to prevent leakage, and consequently, it is claimed, will cause less friction on the rod than with ordinary packing. Wear on the packing is taken up automatically, and the whole arrangement thus requires little attention. The device, we are told, can readily be fixed to existing engines.

Hydraulic Dredging.

In a paper on "Hydraulic Dredging Machinery" recently presented to the Engineers' Club, of Philadelphia, Mr. C. B. Hunt mentions the early application of the principle of hydraulic dredging—that is, the mixing of dredged material with water and then removing the mixture by suction or otherwise. After referring briefly to the Boy Stone and Bowers dredges as typical machines, he describes in detail the Von Schmidt dredge. Two of these dredges are engaged on the improvement of the Potomac River, at Washington, D. C., under the United States Government. Each is 100 feet by 50 feet, with a semi-circular bow, around which travels a vertical suction pipe 22 inches in diameter, and telescopic. At

2300 yards per day for each dredge. The work was done by contract at prices of 12.37 cents, 15 cents, and 15.45 cents per cubic yard, which includes the cost of levees to confine the semi-fluid material, drains to carry off the water, &c. The final estimates were specified to be taken by cross-sections of the completed fill after it had become solidified and compacted. In conclusion it is noted that the devices and details of hydraulic dredging machines are the subjects of numerous patents, and their most efficient combination may be long deferred. The large number of machines that are still in the experimental stage of development would indicate that the best results attainable from this class of dredges have not yet been accomplished.

New Portable Elevator.

Maynard & Marsh, 12 Cortlandt street, New York, have just brought out a portable elevator, of which we annex a cut. It is specially designed for use in warehouses, breweries and distilleries, or in any place where it is required to pile up casks, boxes or bales. It will be readily seen that the

throttling during admission, or cut off or leakage after cut off. Similarly the best effect is produced in gas engines by giving the maximum pressure rapidly while the piston is on the dead-point, and by adding as little heat as possible afterward. The so-called "nachbrennen" or slow combustion should be avoided if possible, its action may be compared to that of a leaking slide valve in an expansion engine. Theory teaches that three things should be striven for:

1. The pressure should be developed at the highest possible speed, and all the heat added at once.
2. The previous compression should be as high as possible. The useful work obtained increases more rapidly than the increase of work compressing.
3. Cooling by the cylinder-walls should be avoided.

The compression on practical grounds must be limited to two or three atmospheres, and to prevent cooling is impossible as the cylinder must be kept cool by water in order to work, and the difference between its temperature and that of the explosion can never be less than 1000° C. (1832° F.). As



NEW PORTABLE ELEVATOR.

elevator can be moved on its own trucks to any part of the floor. The load placed upon it can be easily raised to the required height. They are made of any capacity, height and size, and it is claimed that with one of them two men can do the work of six as compared with the old methods. The elevator may run on heavy swivel casters, or on axles and wheels as shown. The latter is the usual form, as the machine cannot back off in loading or unloading. In this case a fifth wheel is brought into action, by which the structure is easily turned in any direction.

The Theory of Combustion in the Gas Engine.

In the excerpt minutes of the proceedings of the British Institution of Civil Engineers we find an abstract of an interesting paper

the cooling is a function of time, high piston speed is necessary to reduce loss, as cooling is also a function of surface exposed, the form of the cylinder should be such as to expose the least possible surface. Otto's engines, as well as Kötting's work by the cycle, discovered by Beau de Rochas, and experiments have been made to discover the best proportions of engine and dilation of charge. Otto considers it necessary to use air as a diluent, in addition to the products of combustion already existing in the compression space. Here the author differs from him, and takes in pure mixture of gas and air during the whole stroke of the engine, mixing it only with the inert gases already in the cylinder. Careful consideration shows that stratification is undesirable, and although Otto describes it in his

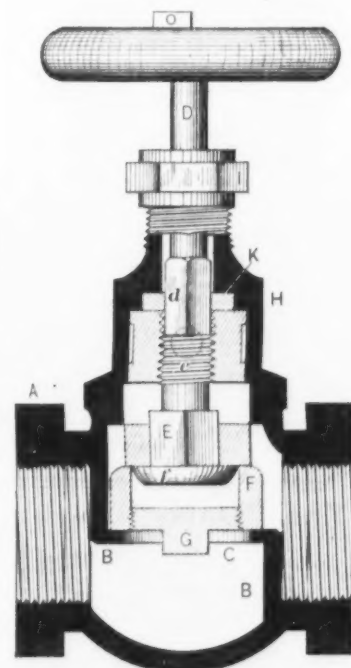


Fig. 1.—Vertical Section of Valve and Casing.

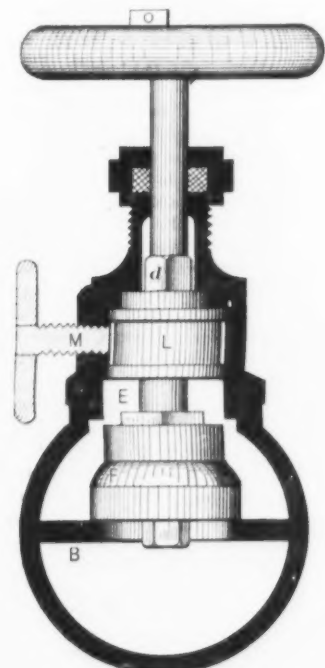


Fig. 2.—Vertical Section at Right Angles.

THE WADE VALVE, MADE BY THE FRONTIER IRON AND BRASS WORKS, DETROIT, MICH.

must turn with it, but is capable of a reciprocating motion on it to a limited extent. The lower end of the stem is therefore made square, as at E, and is finished with a head f. This is shown in Fig. 1.

The valve F is bored out from its lower end a short distance large enough to receive the head f, and from this point to its upper end is made with a square hole to receive the part E, and the valve fits loosely on the stem. In the lower end of the valve is a screw plug, G, against which the head f comes when the stem D is screwed down to force the valve against its seat. It is evident that this construction permits the use of this valve as a check-valve, because, when the valve F is forced against its seat, screwing up the stem will not raise the valve until the head f comes against the shoulder in the valve, and the stem can be raised to this extent and leave the valve in position to operate as an ordinary check valve. At the side of the cage H is a set screw so arranged that when screwed in it will come in contact with the periphery of the nut L, and hold it fast, so that it cannot rotate with the stem. When, therefore, this set-screw is turned in against the nut L, the rotation of the stem causes the latter to raise or lower the valve in the ordinary manner, but when the set screw is turned out, so that it does not hold the nut L, the latter will rotate with the stem D without raising or lowering the valve F. Should the seat or valve become a little worn, so as to leak, or should the seat become coated with sediment, it can be cleaned or ground without removing any of the parts of the valve by simply turning the valve down on the seat, unscrewing the set screw D, to free nut L, and then rotating the stem D, either by the hand-wheel or by attaching a brace or lever which will revolve the face of the valve F on its seat. Any sediment that is present can thus be ground off. If the seat needs too much grinding to be readily done with the valve F, the cage H can be unscrewed, a steel burr secured to the end of stem D, the cage H screwed in place, and the seat ground, as before. The seat can therefore be ground without the use of a special machine, and without the necessity of removing the valve from its position.

new high-pressure boilers on their system of forced draft, the engines at the same time being adapted to the principle of quadruple expansion, according to Mr. Howden's patent arrangement. The same firm have also under construction two sets of triple-expansion engines of from 1200 to 1400 indicated horse-power, with boilers working on the patent forced-draft system and at a steam pressure of 160 pounds per square inch. These engines and boilers are for two new steamers now building for Messrs. Robert MacAndrew & Co., of London, who have already had most satisfactory experience with triple-expansion engines and forced-draft boilers working at the pressure just mentioned. Messrs. Howden & Co. have spent much trouble and expense in successfully overcoming the practical difficulties connected with the use of forced draft in steam boilers, and they can now confidently look for some reward.

Mr. White, the English Director of Naval Construction, has made a very instructive comparison of old and new styles of war ships. The armor plating alone of the British ship Inflexible cost \$850,000, the propelling machinery \$530,000, the hydraulic gun mountings and auxiliary engines of various kinds \$275,000, which three items alone would be sufficient to produce five first-raters of Nelson's time. The vast sums of money that have been spent on the Inflexible seem out of all proportion to the result obtained, especially when it is considered that the same sum of money will now allow of four powerful, protected cruisers being built, capable of steaming 20 knots an hour, or six knots faster than the Inflexible.

The Louisville papers contain long accounts of wonderful experiments made by W. J. Miles, Jr. with a secret tempering process for edge tools, &c. "I can say," said the young inventor to a reporter of the Courier Journal, "that I have practically had 55 years of experience, because my father taught me all he had learned and gave me a good many years of actual experience of my own."

Coal Market.

The general Coal situation has much improved within the week, and in 10 days more at furthest the trade will be fully re-established. Several of the companies are doing more than their ordinary amount of business at this season—the Pennsylvania Coal Company, for example, but they are proceeding cautiously, particularly as to accepting new orders. This appears from the fact that two or three big contracts for Anthracite are in the market, one from a railroad company for 100,000 tons, but just now there are no takers—producers and customers being wide apart in their ideas. The Reading Railroad Company resumed business yesterday at Elizabethport, but propose to "go slowly," receiving at that point for the present not more than 300 cars a day. The feeling of caution was illustrated by the acceptance of orders for six cargoes only out of about twice that number received. Prices are advanced from \$3.85 to \$4, f.o.b., as they stood before the strike, to \$4 for Broken, and from \$3.65 to \$4 for Chestnut, other sizes remaining unchanged. The companies, as a rule, are attempting little beyond keeping up to their contracts, but, as above remarked, expect to make deliveries without distinction a week or ten days later. Nothing is said of an allotment for March.

Bituminous Coal will be advanced in price March 1, simultaneously with an advance to the miners throughout the Clearfield and Cumberland regions. It is understood that the advance in wages will be something like 10¢ @ 20¢ per ton. The Berwind-White Company are forwarding from their depot at South Amboy seven or eight boats a day, which is about one-half the usual average. This is sufficient to supply the European and other regular lines without detention. Two or three steamers have partially loaded at Halifax, but Bituminous Coal at Halifax is higher. The Coal in Baltimore is \$2.50 @ \$2.75, freight to New York, \$1.75; add for towing in harbor 75¢ and unloading 25¢; total cost of one ton, \$5.25. The New Central Coal Company decline to make engagements of any magnitude on these terms while the market is so much unsettled. Large amounts of Coal are going forward to Eastern ports from Baltimore direct, but when cargoes are destined for New York boatmen are shy. In New York Harbor and vicinity the Coal movement corresponds in volume with the gradual improvement of the working force. The Chicago Coal Exchange has resolved to advance the wholesale price of Anthracite Coal 50¢.

The total amount of Anthracite Coal sent to market for the week was 618,037 tons, compared with 524,911 tons in the corresponding week last year, an increase of 93,126 tons. The total amount of Anthracite mined thus far in the year is 2,697,084 tons, compared with 2,844,571 tons for the same period last year, a decrease of 147,487 tons. The shipments from the mines of the Cumberland Coal region for the week were 45,657 tons, and for the year to date 229,824 tons.

Witherbee, Sherman & Co., Port Henry, N. Y., issue a circular under date of February 8 announcing that they offer for sale and delivery prior to December 31, 1887, the following product of their Old Bed Mine, as well as that of the Port Henry Iron Ore Company's 21 Mine, at the following prices, under the name of "Old Bed 21" ore: 130,000 tons selected lump for puddling, \$4.50 per ton of 2240 pounds; 200,000 tons furnace ore, \$2.75 per ton of 2240 pounds. It is stated in the circular that these prices are intended to apply only to contracts for specific quantities of ore which may be made before April 1.

E. W. Barnes, of the Carthage Foundry and Machine Company, Carthage, Mo., has issued the following circular, dated February 5, 1887. I have this day sold a portion of the stock of the above named works to M. D. Heltzell, late of St. Louis, and O. E. Cope, late of the Buckeye Engine Works, Salem, Ohio. Mr. Heltzell has a business experience of over 30 years, and will have charge of the sales department. Mr. Cope is a thorough practical mechanic, draftsman and engineer, and will have charge of the machine shops and foundry. This will put our works in a position, both financially and in practical experience, second to none in the Western country. With new and improved machinery now on the way to our works, we will be prepared to manufacture and supply all demands for steam engines, hoisting machinery, pumps and all appliances used for mining purposes. We will also give special attention to millwork, both new and repairing.

The manufacture of pine leaf into a material to be used in the arts, so far as known, is pursued only in North Carolina. The works are built at Cronly, a station on the Carolina Central Railroad, 17 miles from Wilmington. The daily product is 1500 pounds of pine-leaf hair and curled-pine straw, sold to furniture and carriage manufacturers for stuffing cushions, chairs, sofas, &c., while the latter is used exclusively for mattresses, and is so prepared as to preserve the balsamic odor, for which medicinal virtues are claimed. In the process of manufacture an oil is distilled, called *pinoleum*, that is considered valuable for its curative properties. The mattresses are sold largely for hospital purposes, and a large trade for all the products of the factory has been established in the Northern States and Canada. Carders, looms and spinners have been added, and the fiber is converted into carpets and matting which

will be both useful and healthful. The natural color is brown, like the dried straw, but the fiber takes and holds dyes as well as any fiber, and better than most, and can be bleached nearly white.

McLanahan & Stone, founders and machinists, Hollidaysburg, Pa., have the contract for the erection of the furnace for the Bellefonte Iron Company, Bellefonte, Pa. There will be two of their large horizontal blowing engines used. They are also making columns, base and mantle plates for the Connewaugh Furnace.

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The "Daisy" Wringer.



Tub Wringers, Bench Wringers, Clothes Drying Bars, &c.

EMPIRE WRINGER CO., AUBURN, N. Y.

A. F. PIKE MFG. CO.,

Pike Station, New Hampshire, U. S. A.,

WORLD'S HEADQUARTERS FOR

Scythe Stones, Oil and Water Stones, Grindstones, Razor Hones, &c.,

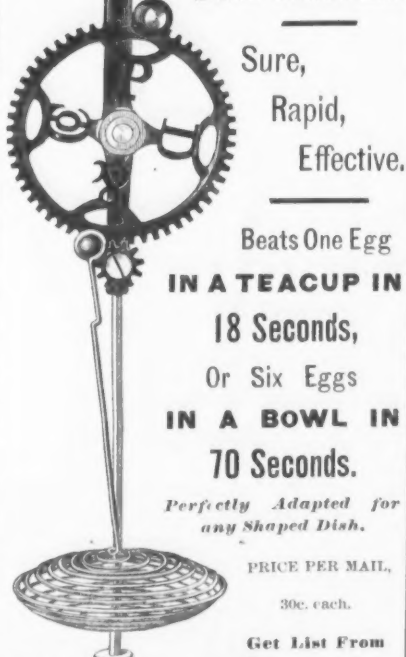
and everything for sharpening Edge Tools

Best cheap Scythe Stones, "Leader" Red Euds at \$1.50 per gross, in five gross lots, f. o. b. factory, 60 days. Grindstones cheap. Best Lake Huron at \$6.50 per ton, f. o. b. Pt. Austin, 60 days. Choice White Washita in all shapes. The celebrated Hony Red Washita is a soft, free cutting stone and warranted to give satisfaction.

The genuine "Dodge" Chocolate is the best Water Stone in the world. Send ten cents to pay postage and packing and we will send you a nice little Desk Stone and Paper Weight.



THE P. D. & CO. PATENT EGG BEATER.



Beats One Egg IN A TEACUP IN 18 Seconds, Or Six Eggs IN A BOWL IN 70 Seconds.

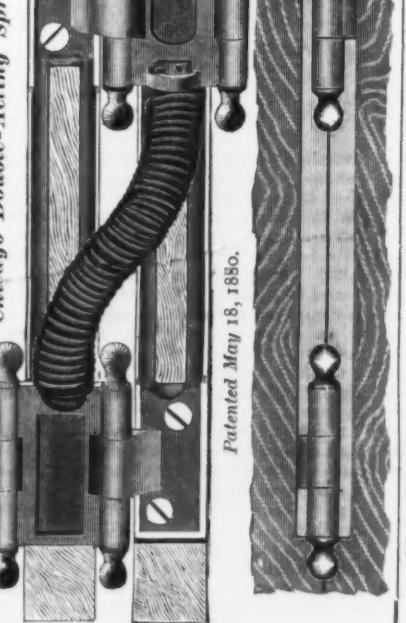
Perfectly Adapted for any Shaped Dish.

PRICE PER MAIL, 30c. each.

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Paine, Diehl & Co.,

12 Bank St., Philadelphia, Pa.



DOORS.	1	21	31	41	51
Jap'd Pair.					
1 1/2 to 1 3/4 in.	\$1.20	\$3.00	\$4.00	\$8.50	\$8.50
1 3/4 to 1 7/8 in.	1.50	3.75	3.75	9.50	9.50
1 7/8 to 2 in.	2.50	6.50	5.50	12.00	12.00
2 to 2 1/4 in.	4.00	7.50	7.50	20.00	20.00
2 1/4 to 2 1/2 in.	7.00	10.00	10.00	30.00	30.00
2 1/2 to 2 3/4 in.	10.00	14.00	14.00	39.00	39.00

Manufactured by CHICAGO SPRING BUTT CO.,

42 & 44 W. MONROE ST., CHICAGO.

C. E. BRETTELL.

Water Street, Rochester, N. Y.

Improved Planers a Specialty; 20 x 20, 22 x 22, 24 x 24

20 x 30, 30 x 30, 36 x 30, to plane any desired length. Send for Description and Prices before Purchasing.



Mfrs. 'Art. for other Tools.

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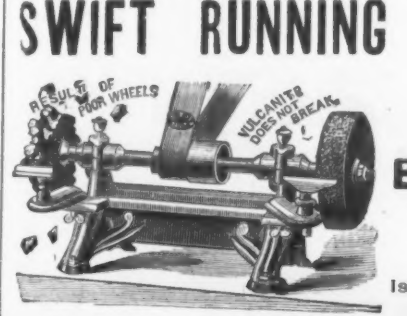
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SWIFT RUNNING EMERY WHEELS.



THE ORIGINAL SOLID VULCANITE EMERY WHEELS

Runs Easy and Safe, Cool and True.

Is More Durable — Hence Cheaper.

A trial will convince you of this.

NEW YORK BELTING AND PACKING CO.,

J. H. CHEEVER, Treas.

Sole Manufacturers, 15 Park Row, New York.

W. BINGHAM & CO.,

MANUFACTURERS AND DEALERS IN

HARDWARE,

RAILWAY, MINERS', ENGINEERS', ARCHITECTS', MECHANICS' MACHINISTS' and FACTORY TOOLS and SUPPLIES.

146, 148 and 150 Water St.,

CLEVELAND, OHIO.

"The Princess" Wardrobe Hook.

Made in several sizes in Steel and in fine polished Brass. The most perfect model for a sensible and indestructible Wardrobe Hook. No sharp edges, no pointed screw, so much to prevent the easy removal of anything hung upon it. In polished brass they are very handsome, and are less than half the price of any brass hook that can be made by any other device.

Hooks and Bright Wire Goods in great variety. Specialties in Wire. Wire Nails of all kinds and sizes.

THE WIRE GOODS CO., WORCESTER, MASS.

SCREW CURTAIN CORD RACK OR TIGHTENER.

The Thumb-screw at A Regulates Tension of Cord.

Made of gray cast iron, lacquered or bronzed; is selling very well in this vicinity. Patent for sale cheap, with a full set of patterns for all the parts. For further information, address the inventor and manufacturer,

F. E. PORTER,

83 South Charles St., Baltimore, Md.

REID'S LIGHTNING BRACE.

SPECIALY DESIGNED FOR LIGHT BORING, SCREW DRIVING AND

NICKEL PLATED WITH 2 BITS 2.75 POST PAID. A. REID.

ROSEWOOD TRIMMINGS 1635 BARKER ST. PHILA. Agents Wanted.

Established 1830.

THE PLYMOUTH MILLS.

Rivets, Trunk Nails, Tacks, Clout Nails, Burrs, Wire Nails

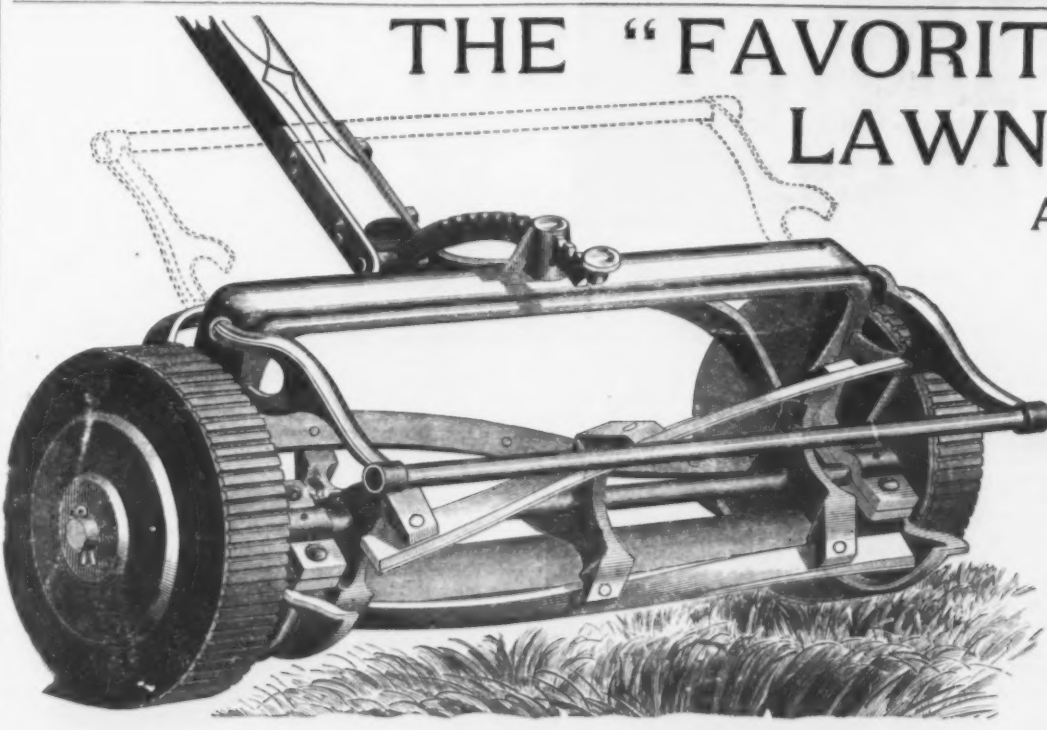
PLYMOUTH, MASS.

THE "FAVORITE" LAWN MOWER.

A SPLENDID SUCCESS.

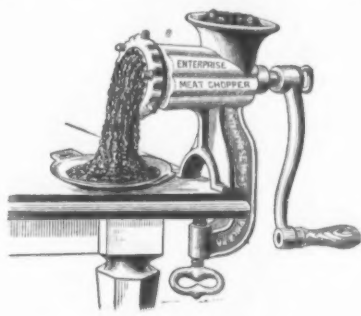
The Favorite is handsomely finished in Black and Gold, producing a very novel and attractive appearance. The Favorite runs with greater ease, and more nearly noiseless than any other Mower on the market. In no other Mower can the height of the cutting knives be so readily adjusted to cut from 1/2 up to 2 inches, as may be desired, accomplished by means of the segment connecting the handle and the frame. The Favorite is always driven directly from the center; is made with solid frame so that all parts are united together as a single piece; is provided with an adjustable tree guard, which, when desired, can be thrown forward to protect trees or shrubbery from injury, or, when not needed, can be thrown back to lie on the handle. The Favorite will cut grass quicker, closer and easier than any Mower ever introduced to the trade.

Write for Descriptive Circular, Price List and Special Discounts.
J. W. BOOKWALTER & CO., SPRINGFIELD OHIO.



Enterprise Family Meat Chopper, New Style, No. 5.

The Enterprise Mfg. Company, of Philadelphia, are making this article, which is illustrated in the accompanying cut. The meat placed in the chopper is forced forward by the motion of a screw or spiral, and is rapidly chopped fine. The knife has four blades, and each sharp beveled edge comes in contact with the sharp edges of the holes in the blade, thus making with every revolution four cuts for every hole in the blade. The machine is described as chopping



Enterprise Meat Chopper, No. 5.

ing 1/2 pound of meat per minute, and its moderate price, \$2, alluded to. The point that it does not grind, but chops, the meat is emphasized.

Combined Harrow and Cultivator.

E. S. & F. Bateman, Spring Mills, N. J., are making the combined harrow and cultivator with steel diamond teeth, the special features of which are illustrated in the cuts given herewith, Fig. 1 giving a general view of the implement and Fig. 2 illustrating the construction and arrangement of the teeth, a feature to which special attention is called. From Fig. 2 it will be seen that the lower end of the tooth is made under the hammer into the form of a small cultivator tooth, by the use of which, it is claimed, the harrow may be worked very close to small plants,

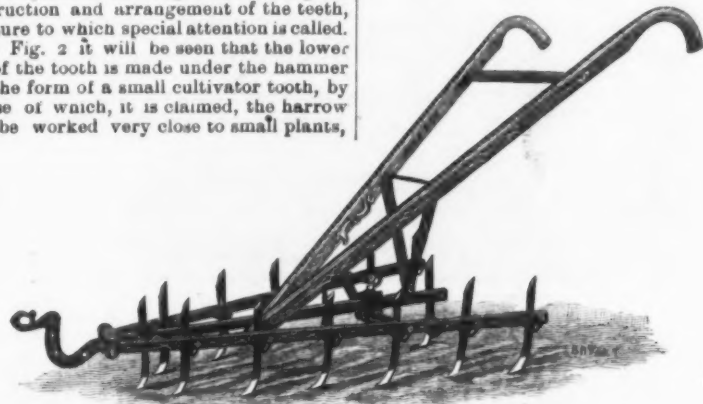


Fig. 1.—Diamond-Toothed Harrow and Cultivator.

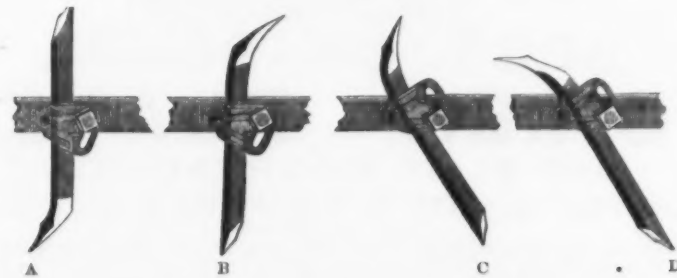
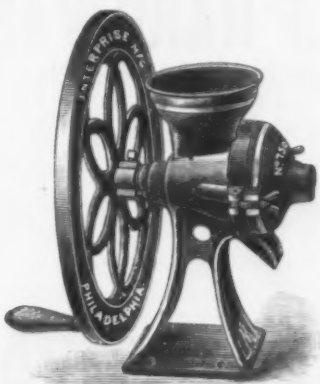


Fig. 2.—Form and Positions of Teeth.

thoroughly pulverizing the soil, yet throwing no dirt. These teeth are susceptible of four changes of position, which are illustrated in Fig. 2. A shows the cultivator tooth as referred to above; B represents it as a straight diamond-point harrow; C as a smoother with sharp point down, in order to cut and level the surface, and D represents the tooth with sheared end down, this position being referred to as less liable to injure young plants when smoothing over corn, potatoes, &c. Like other harrows made by the manufacturers, each alternate tooth can be removed if desired for very close work.

The Enterprise Bone, Shell and Corn Mill.

This mill, which has recently been put on the market by the Enterprise Mfg. Company, of Philadelphia, is designed to meet



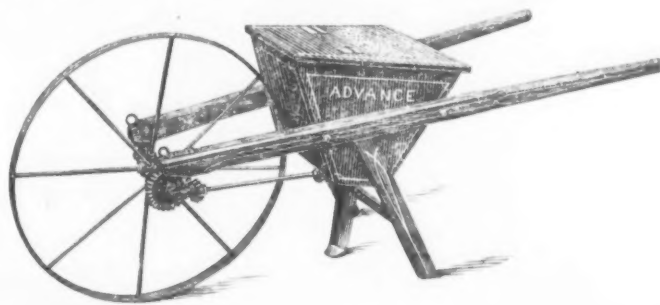
Enterprise Bone, Shell and Corn Mill.

the demand for a general utility mill suited to the wants of farmers, poultry men, and others, and adapted for grinding bones, shells, roots, bark, corn, &c. It is represented in the accompanying illustration, from which it will be seen that a large throat receives the substances to be ground, and allows them to be crushed before passing to the grinding teeth, thus enabling the operator, it is claimed, to grind with facility hard and tough substances, such as are referred to in the name of the mill. It can be

readily adjusted to grind coarse or fine by means of a simple thumb screw in the center of the fly-wheel, and can be taken apart for cleaning, &c. in a few seconds. Its strength, compactness, and simplicity of construction are alluded to. Its price is \$7.50.

The Advance Fertilizer Drill.

The illustration which we present here-with represents this article, which is manufactured by E. S. & F. Bateman, Spring Mills, N. J., and which is alluded to as possessing advantages over similar implements in use. Instead of having a distribution disk of glass, it has one of wrought iron galvanized, the advantages of which are referred to as being that it will neither break nor rust, thus obviating the faults of glass



The Advance Fertilizer Drill.

and cast iron. The agitator is also new, being of steel in the form of two knife-shaped arms sweeping around under the mass of fertilizer, and throwing it upon the revolving disk below. Attention is also called to the fact that the wheel is of wrought iron, strong, but light, thus reducing the weight

Philadelphia, Pa., is their Family Coffee and Spice Mill, which is represented in the illustration given herewith. It is designated as their No. 0. It is made with clamp attachment, which permits it to be attached to a table or ledge and removed at pleasure. The grinders are made of hard chilled iron, and are described as in action, first crushing and then grinding the coffee or spice. Their adjustment is by means of a simple thumb-screw on the fly-wheel. The receiver is made to fit into the hopper, so that when not in use it is in a convenient place, and also forms a cover protecting the internal parts

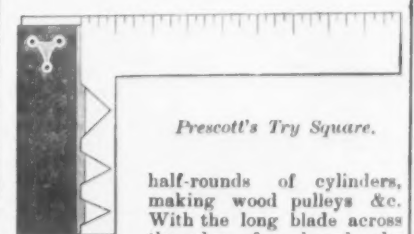


Enterprise Coffee and Spice Mill, No. 0.

of the mill from dust, &c. The attractiveness of the finish given is alluded to, its price, \$1.50, being referred to as giving it a place among the economical supplies for the household.

Prescott's Try Square.

Nichols, Bellamy & Co., No. 657 Washington street, Boston, Mass., are putting upon the market an improved try square, an engraving of which is shown below. In its general features this square is identical with the tools in common use. An auxiliary blade, however, extends downward from the regular blade and along the side of the stock. This is notched as shown in the engraving. The auxiliary blade, it is claimed, adds much to the usefulness of the square by holding it in position for ordinary use. It also serves in many cases for laying out miter joints, key seats, parallel lines on



Prescott's Try Square.

half-rounds of cylinders, making wood pulleys &c. With the long blade across the edge of a board, the larger opening will give the angle of 45°; the middle one an angle of 60°; and the smaller one an angle of 67 1/2°. These provide successively the miter cut, the cut for a hexagonal bay window and for octagonal work. Referring to roofing, the larger opening gives the angle of square pitch for rafters, the middle one what is known as Gothic pitch, and the third knife edge. Among the directions supplied by the makers for the use of this tool, we find the following: "To make a rafter pattern, square the end of the board, and with the stock of the square across the end, get the angle of the lower end of the rafter; then with the stock on the edge of the board, the same opening will give the angle for the upper end." The article is supplied at about the same price as the ordinary tool of the same description, and is handled by the hardware trade.

A rivet-pitch calculating scale for engineers, draftsman and boiler-makers, by which the pitch that will give equal strength of plate and rivet, or the pitch being fixed, give the relative percentages of strength of plate and rivet, has been brought out in Ireland. It was designed by Mr. W. C. Carter, of 129 Albert Bridge road, Belfast, and comprises the requirements of Lloyd's and of the Board of Trade, and is adjustable to the proportions desired by the user. The scale has two moving pieces, by the movement of which, according to a very readily learned method, the pitches, &c., are read off without calculation. It is but 7 inches in length and 2 inches in width.

Imports.

The following were the Imports of Hardware, Iron, Steel and Metals into the Port of New York for the week ending February 16, 1887:

Quantity.	Value.
Avrils, 35	\$326
Brass goods, 31	2,177
Bronzes, 16	1,779
Chains and anchors, 77	3,259
Clocks, 22	1,825
Copper, 1,311	1,311
Copper ore, 30,534	30,534
Cutlery, 74	18,970
Guns, 19	4,980
Hardware, 81	12,138
Iron, sheet, tons, 119	4,847
Iron, spigot, tons, 755	17,282
Iron, other, tons, 706	1,678
Machinery, 85	42,715
Metal goods, 408	37,493
Needles, 14	4,887
Old metal, 10,327	10,327
Plating, 3	16,348
Plumbago, 3,652	41,614
Saddlery, 6	1,284
Steel, 73,194	102,327
Tin, bxs., 45,182	108,964
Tin, slabs, 1,040	9,986
Wire, 55	8,559
Zinc, oxide, 300	1,868

The imports at this port of Cutlery, Hardware and Metals during the week ending February 11 were as follows:

Quantity.	Value.
Avrils, 35	\$326
Brass goods, 31	2,177
Bronzes, 16	1,779
Chains and anchors, 77	3,259
Clocks, 22	1,825
Copper, 1,311	1,311
Copper ore, 30,534	30,534
Cutlery, 74	18,970
Guns, 19	4,980
Hardware, 81	12,138
Iron, sheet, tons, 119	4,847
Iron, spigot, tons, 755	17,282
Iron, other, tons, 706	1,678
Machinery, 85	42,715
Metal goods, 408	37,493
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Plumbago, 3,652	41,614
Saddlery, 6	1,284
Steel, 73,194	102,327
Tin, bxs., 45,182	108,964
Tin, slabs, 1,040	9,986
Wire, 55	8,559
Zinc, oxide, 300	1,868

A Belgian Steamer for the Congo.—The John Cockerill Company recently completed a small stern-wheel steamer, which has received the name of the Ville de Bruxelles, and which is intended to ply on the Upper Congo or its affluents from Leopoldville to Stanley Falls. The Ville de Bruxelles was specially ordered by the Government of the Congo. She is 84 feet 1 1/2 inches long, 18 feet 4 inches beam and 4 feet 6 1/2 inches deep. The engine is placed in the stern, while the boilers are placed forward, the boilers being of mild steel, and worked at a pressure of 10 atmospheres. The Ville de Bruxelles is built entirely of wood, so that her hull slightly exceeds in weight a steel hull of similar size. Several reasons have induced the Government of the Congo to order a wooden vessel. One of these reasons is the greater ease with which a leak may be made good in a wooden, as compared with a steel or iron hull, while it is also easier to train natives in working wood than in working metals. The Government of the Congo has some idea of using the Ville de Bruxelles as a pattern from which other vessels may be built on the spot. There is an abundance of timber on the banks of the Congo, and sundry waterfalls might be utilized for the establishment of sawmills at little expense. In a trial trip made by the Ville de Bruxelles on the Scheldt she attained an average speed of nearly 8 1/2 knots per hour, the engines working up to 60 horse-power,

and making 38 revolutions per minute. The Ville de Bruxelles will be shipped in pieces, and will be carried overland from Roma to Leopoldville. She is expected to be ready for service at Leopoldville in the course of the summer.

Exports.

The following table presents the exports of Hardware, Iron, Steel, Metals, &c., from the port of New York, for the week ending February 15, 1887:

Quantity.	Value.
Avrils, 35	\$326
Brass goods, 31	2,177
Bronzes, 16	1,779
Chains and anchors, 77	3,259
Clocks, 22	1,825
Copper, 1,311	1,311
Copper ore, 30,534	30,534
Cutlery, 74	18,970
Guns, 19	4,980
Hardware, 81	12,138
Iron, sheet, tons, 119	4,847
Iron, spigot, tons, 755	17,282
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Machinery, 85	42,715
Metal goods, 408	37,493
Needles, 14	4,887
Old metal, 10,327	10,327
Plating, 3	16,348
Plumbago, 3,652	41,614
Saddlery, 6	1,284
Steel, 73,194	102,327
Tin, bxs., 45,182	108,964
Tin, slabs, 1,040	9,986
Wire, 55	8,559
Zinc, oxide, 300	1,868

L. COES'
GENUINE IMPROVED
Knife Handle
PATENT
Screw Wrenches
MANUFACTURED BY
L. COES & CO.,
Worcester, Mass.
ESTABLISHED IN 1830.




Patented July 6, 1880. Patented July 8, 1884.
Registered March 31, 1874.

Sectional view illustrates our NEW KNIFE HANDLE, showing Malleable Iron Frame and Shank of Bar keyed into position.
Straight Bar, Extra LONG NUT FOR SCREW IN JAW.

The Best Made and Strongest Wrench in the Market.
Send for Illustrated Price List and Circular.

J. C. McCARTY & CO.,
NEW YORK,
Sole Agents.

ILLINOIS IRON & BOLT CO.,

Nos. 20 to 26 Main Street,

CARPENTERSVILLE, KANE CO., ILL.

MANUFACTURERS OF

Blacksmiths' Tools,

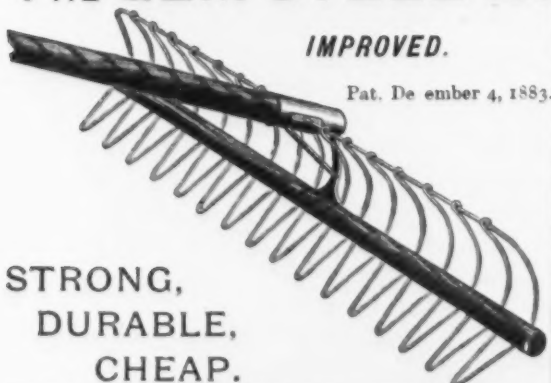


Thimble Skins,

LOCOMOTIVE JACK SCREWS

Track Jacks, Carriage Makers' Vises,
SAD IRONS, COPYING PRESSES AND STANDS, &c.

THE GEM STEEL WIRE RAKE.

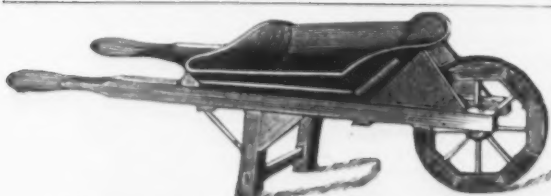


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The best Rake for Lawns in the market, made in the most thorough manner of the best materials. Heads and Handles of the best second growth White Ash, Teeth of No. 10 and 11 Coppered Steel Spring Wire. Send for special discounts and descriptive catalogue to

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R. R. or Levee Oak
Barrow as a Specialty.

The Strongest and Most Durable Barrow in the Market. Write for Prices.
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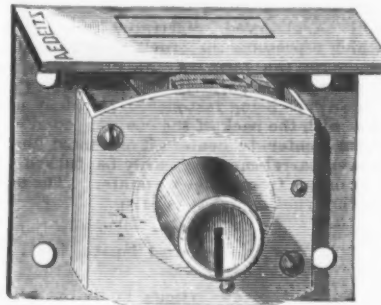


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21 and 23 ANN STREET, NEW YORK.
Manufacturers of
SPEAKING TUBES, WHISTLES, ELBOWS, ORAL ANNUNCIATORS, BELL & ELECTRIC WIRE TAPPING.

Complete Outfits of Speaking Tubes, Whistles, Pneumatic Bells, &c. A full line of Speaking Tube Hardware constantly on hand. Catalogues on application. Factory, DeKalb, near Knickerbocker, Brooklyn, L. I.



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MANUFACTURERS OF
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HARDWARE.
Nos. 16 & 18 Chambers Street,
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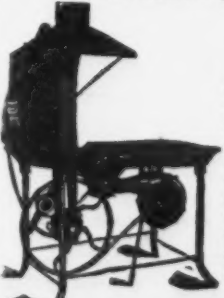
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Manufacturers of
THE LEVIATHAN
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Unsurpassed for
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Made to any Length,
Width and Strength.
Main Driving Belts.
Guaranteed to Run
Straight, Even Through-
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No Cross Joints, Un-
affected by Damp.
Clings well to the Pulley.
Has no equal in fact,
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THE CHAMPION LEVER BLOWERS & FORGES

Are the Leaders of the World.



An entirely novel
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Cog Wheels, Ratchets,
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FOR SALE EVERYWHERE
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FLORENCE, MASS.

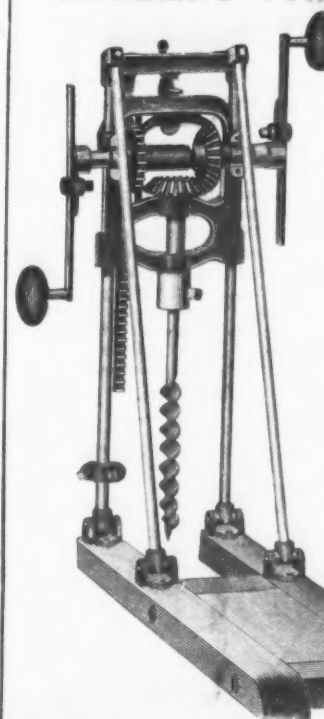
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The attention of Hematite ore miners is called to our new Jig. The simplest and most effective separator now in use.

McLANAHAN & STONE,
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Manufacturers of Ore Washers, Screens, Elevators, Conveyors, any general Ore Mining Machinery.

MILLERS FALLS BORING MACHINE.



THIS Machine has been fully perfected in all its parts, and is now sold with full warrant that it will do better work and give better satisfaction than any other kind in use. The frame is made of half-inch round steel rods; the braces are the same and attach to the rods at the top by a set screw. When this set screw is loosened, the frame falls over so as to bore at any desired angle.

The depth of hole to be bored is fixed by a stop, as seen on the left hand upright rod in the cut. When the gate strikes this stop a latch is lifted and the machine throws itself into gear by the use of a spring, and the Auger is lifted out of the hole by continuing to turn the crank in the same direction.

When the Auger is drawn from the hole the frame hangs itself up until the machine is moved to the next hole, then it is dropped down by turning the crank back until the Auger strikes the wood, when it is thrown out of gear and proceeds to bore the next hole. As seen in the cut, the machine has adjustable cranks which fully regulate its speed and power.

PRICES:

Machine, without Augers, \$7.50
Augers in sets, 18, 23, 41 quarters.
\$3.00, \$3.75, \$6.75.
Sizes of Augers (1, 1 1/2, 2) (1, 1 1/4, 1 1/2, 2)
(1/2, 3/4, 1, 1 1/4, 1 1/2, 1 3/4, 2).

MILLERS FALLS CO.,

74 Chambers Street, New York.

CHAMPLAIN
Forged Horse Nails.
MANUFACTURED BY THE
NATIONAL HORSE NAIL CO.,
Vergennes, Vermont.
HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST
NORWAY IRON AND WARRANTED.
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MANUFACTURERS OF

BEST CHARCOAL BOILER PLATES,

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ALSO BEST QUALITY HOMOGENEOUS STEEL PLATES.

We ask the special attention of the trade to our C. H. No. 1 Boiler Plates, which we manufacture expressly for the Shells of Steam Boilers and stamp 50,000 pounds T. S. when desired. One hundred and sixteen tests of this iron, made during the last three years by the U. S. Inspectors of Steam Vessels, show an average tensile strength of 58,800 pounds to the sectional square inch, and an average reduction of area of the fractured section of 30% per centum. Our prices are as low as the production of a good article will admit of.

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POTTSVILLE, PA., Manufacturers of all kinds of

STRUCTURAL STEEL AND IRON

Viz, BEAMS, CHANNELS, TEES, ANGLES, PLATES AND BARS; Also STEEL
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This Steel is manufactured by the CLAPP-GRIFFITHS process, and is specially adapted, in addition to the above, for Boiler and Bridge Rivets, Wire Rods, Nail Plates, &c. &c. Our Mild Steel is well adapted for use in place of the best quality of Wrought Iron; where a greater strength and ductility is required, it welds readily as iron. Also Builders, Slabs of all sizes and any desired temper. Shaping of all sizes in stock, from which prompt shipments can be made.

Brewery, Malt and Ice House Construction a Specialty.

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Hardware Mfg. Co.,
MANUFACTURERS OF

GREY IRON SHELF HARDWARE.

Our Specialties: Axle Pulleys, Well Wheels, Grind-
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Works: 11th and Papin and 12th and Gratiot Streets, St. Louis.

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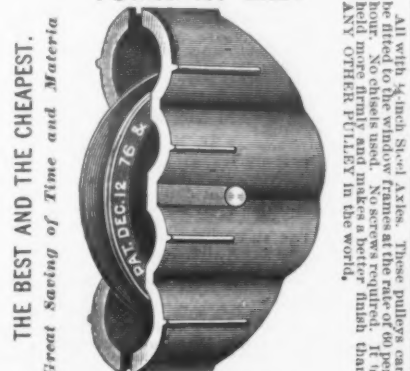
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UNIVERSAL
FLEXIBLE
WEATHER & DUST
"THE BEST" STRIP.
ANY ONE CAN APPLY IT.

Has been on the market for nine years, is sold by Hardware Dealers all over the United States, and acknowledged to be the best and neatest. Excellent shelf goods. Send for samples and discounts.

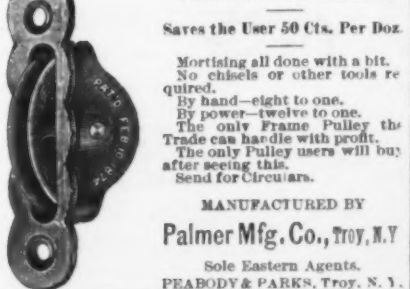
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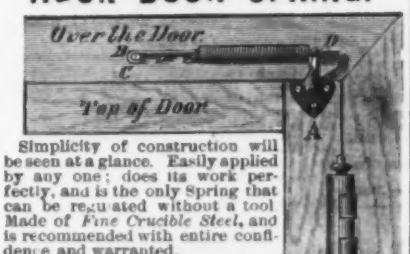


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Manufacturers of the largest and best line of
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For prices and full description, address,
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THE PERFECT DOOR SPRING.
Cheap, Simple, Durable, Effective.
FOR LIGHT AND HEAVY DOORS.
Indorsed by the Trade.



Made in four sizes of the best Crucible Steel Wire.
The smaller sizes have no equal for strength and light doors.
COILED WIRE BELTING CO., 93 CHIN ST. NEW YORK

KEITH & TRUFANT
MANUFACTURERS OF
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CAMPBELL & WIRE TACKS
MASS. OF EVERY DESCRIPTION.



See how the transom may be lifted.
We also manufacture several other devices.
Send for catalogue and price list.



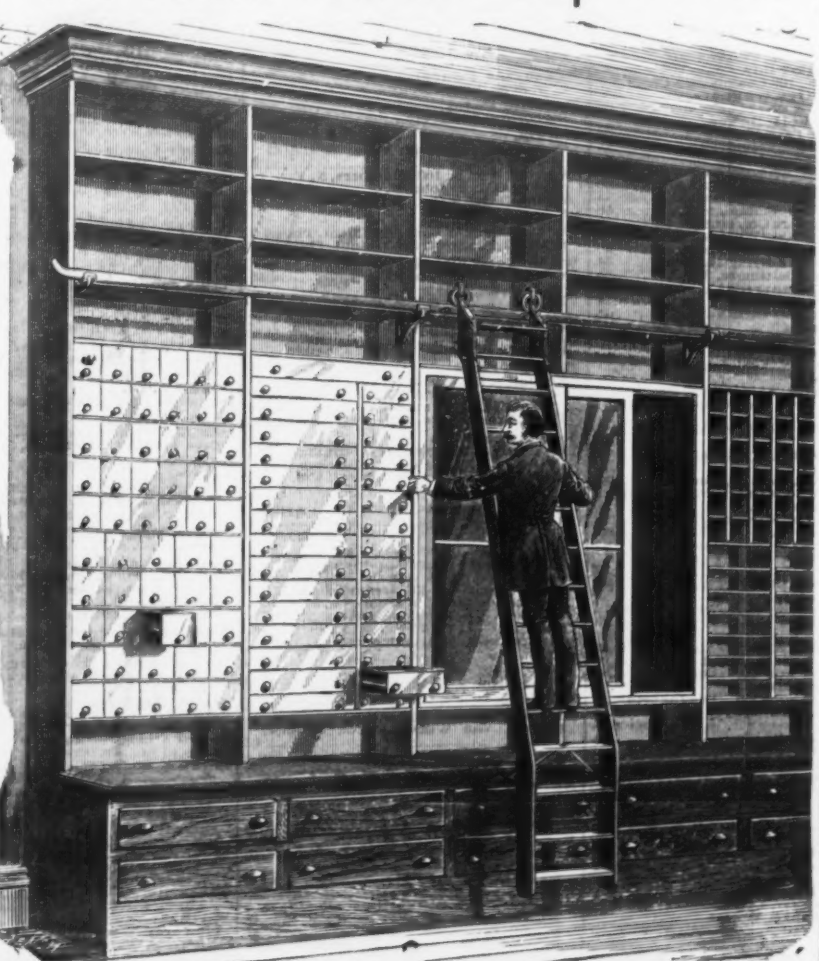
Wrought Iron.
Anti-Friction.

IT EXCELS ALL OTHERS

Security of Door.
Strength of Material.
Ease of Motion.
Simplicity of Application.
THIS HANGER
Requires no Oil.
Has no Flanged Wheels.
Packs snugly for Shipment.
SELLS BEST.

VICTOR
MFG. CO.,
Newburyport, Mass.

The Patent Railroad Step Ladder.



"SATISFACTORY IN EVERY WAY."

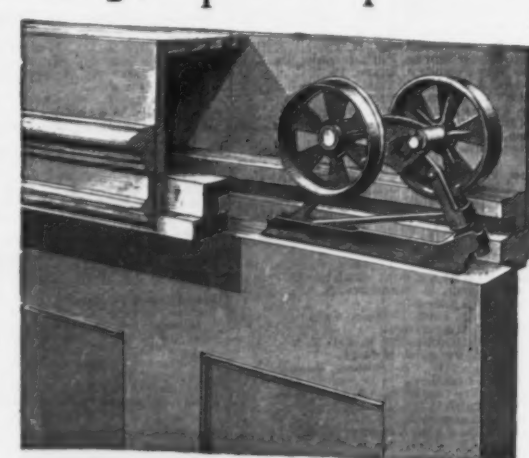
Morley Brothers, East Saginaw, Mich.:
DEAR SIR:—We have 120 feet of Track and thirty of the Patent Railroad Step Ladders in use in our store and are very much pleased with the manner in which they work. They are satisfactory in every way and we cheerfully recommend them.
Yours truly,
HIBBARD, SPENCER, BARTLETT & CO.

"HEARTILY ENDORSE THEM. WORTH TWICE THE COST."
WEEDER & VON BEHREN,
HARDWARE, STOVES, PAINTS, OILS, GLASS,
TOLEDO, OHIO, June 5, 1886.
DEAR SIR:—Responding to your favor of the 3d inst., would say that we can heartily endorse your Ladders and can recommend them to every hardware dealer. They are worth twice the cost. We do not see how we could do without them now. Wishing you success, we remain
Yours truly,
WEEDER & VON BEHREN.

FOR CATALOGUES AND PRICES, ADDRESS

MORLEY BROS., East Saginaw, Mich.

Barry's Patent Parlor Door Hanger.



The only Hanger made that
will not bind on an
uneven track.

Send for Circular and Prices
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SYRACUSE BOLT CO.,

Syracuse, N. Y.,

OR

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105 CHAMBERS STREET,
New York Agents.

LANE'S PATENT STEEL DOOR HANGER.

The most perfect Anti-Friction Hanger in the Market,

BECAUSE

It is made of steel throughout, except the wheel which has a steel axle. It will not break. It is practically free from wear. It is almost noiseless in action. It requires no oil. It has a broad bearing on the door, and keeps in line. It is by far the most durable. It may be used with any track. It is always in order.

LANE'S PATENT TRACK

Is made of steel and is easily put in position. Catches and holds no snow or ice. Door hung thereon cannot jump the track. Is not subject to decay. Requires no fitting, but is ready at once. May be used with hangers of other manufacture.

Manufactured by **LANE BROS., Poughkeepsie, N. Y.**

JOHN H. GRAHAM & CO., General Agents, 113 Chambers Street, NEW YORK.

MANUFACTURING.

Iron and Steel.

The Moorhead McCleane Company, of Pittsburgh, proprietors of the Soho Iron Mills and Soho blast furnace, inform us that they have commenced the manufacture of coke, having recently purchased the coke plant of John Matthews, which is situated adjacent to the Soho Furnace, where the coke will be used.

The Clapp-Griffiths steel plant of the Spang Steel and Iron Company, Limited, of Pittsburgh, will be ready for work by March 1. It consists of two 3-ton converters, and its capacity will be about 50,000 tons per annum.

A few weeks ago Bertolet & Lukens, of Philadelphia, acquired by lease the possession of the Stony Creek Iron Works, in Norristown, and immediately put a force of men at work to put the mill in repair, it having been idle since 1885. On the 2d inst., the works went into operation.

The rolling mills of the Beaver Falls Iron Company, at Beaver Falls, Pa., which have been shut down for several months for the purpose of putting in new machinery, have started up in full. A large number of orders have accumulated, and a steady run is now assured.

Messrs. King, Gilbert & Warner, who recently bought Moxhala Furnace, at Moxhala, Ohio, are refitting the plant and expect to blow in some time this month. They have changed the name of the stack to Glasgow Furnace, and will use entirely new ores and different stock from what were formerly used at this furnace. The ores used will be Tuscarawas County black band and Lake Superior; the fuel will consist of one-half coal and one-half coke. The firm intend to make a first-class black-band iron, which will be known as Glasgow American Scotch iron.

Cleveland parties are interested in the formation of a company for the purpose of building a rolling mill in Birmingham, Ala. The preliminaries have been arranged and the organization will be perfected in a short time.—Trade Review.

The stockholders of the Crane Iron Company, of Catsaqua, held their annual meeting on the 9th inst., at the office, 224 South Fourth street, Philadelphia, and elected the following Board of Directors, Messrs. Samuel Dickson, Fischer Hazard, Charles S. Haven, Robert Lennex Kennedy, Charles S. Wurtz, Henry Windsor, Lemuel Coffin, Alexander Biddle, Samuel R. Shipley, George M. Troutman.

The Champion Steel and Iron Works, of Springfield, Ohio, under date of February 5, issue a circular to the trade withdrawing all quotations made for steel and iron on account of the continued advance in the cost of iron ore, steel ingots and billets. They say, "the increase on Bessemer pig iron alone has averaged almost \$1 per ton each month since the beginning of winter. Steel rails have reached \$40 per ton at the mills, and other steel products must soon follow in proportion. We do not believe this advance will be permanent, yet many of the older iron and steel mills think it will remain at least well along in 1887."

Some time ago Wm. Clark & Co., proprietors of the Solar Iron Works at Pittsburgh, purchased a large tract of land adjacent to the Carrie Furnace, at Rankin Station, near Pittsburgh. Messrs. Clark & Co. are large stockholders in the above furnace, and the purchase gave rise to the rumor that they were about to erect a large iron works on the site, and also to remove their plant from Pittsburgh. These rumors have been so industriously circulated as to cause no little inconvenience to the firm, and they authorize us to state that they have no intentions at present of removing their works from Pittsburgh or erecting a new works on the site purchased.

Mr. James Gayley, superintendent of the furnaces of the Edgar Thomson Steel Works, Pittsburgh, reports the following as the work of Furnace F during January: Total product for month, 8398 gross tons; best week's work, 2161 gross tons; best day's work, 414 gross tons. The average coke consumption per ton of iron made was 1863 pounds. The stack is 22 feet diameter at base and 85 feet high.

The Belfont Iron Works Company, of Ironton, Ohio, turned out 782 kegs of nails week before last. They have 126 machines in their works.

Everett Furnace, of the Everett Iron Company, at Everett, Pa., will be offered for sale to the highest bidder on April 28th next.

The employees in the melting department of the steel works of Hussey, Howe & Co., Limited, at Pittsburgh, have been granted an advance of 20 per cent. in their wages.

The Hecla Company have purchased the Grant Furnace engine, blowers and boilers for their new plant. All these are in good condition. The two boilers are 47 feet by 40 inches. The engine and blowers are the same as now in use at the Ironton Furnace. The air receiver is 20 x 7 feet. The cast-house, engine house and bridge loft will be roofed and sided with corrugated iron. The dimensions of these buildings are respectively 40 x 83 feet, with 20-foot iron columns, 40 x 30 feet and 58 x 47 feet. The chimney will be 50 feet high and 11 feet in diameter, 6 feet in diameter on the inside.—Ironton (Ohio) Register.

The strike of the furnacemen in the Shenango Valley, Pa., which was noted in these columns last week, still continues, though liable to be settled at any time. Every furnace in the valley is now idle, with the exception of Keel Ridge, operated by P. L. Kimberly & Co., of Sharon, Pa.

It is now said that the Old Colony Iron Works, at East Taunton, Mass., will close up its business on the 1st of May, and the affairs of the concern in both East Taunton and Somerset wound up. It is rumored, on what appears to be good authority, that the portion in East Taunton will be taken in

charge by prominent business men of that section, who will establish a nail mill there and once again try to build up that portion of the city.

The Vulcan Iron Works have orders for 150 tons of curve castings for the North Chicago Cable Road, an ice machine for the Consolidated Ice Machine Company, of this city, and a number of pile-drivers for different railway companies. They are very busy in all departments of the works.—Chicago Industrial World.

The Pittsburgh Steel Casting Company, of Pittsburgh, report that their business during January was larger than for any previous month during the company's existence.

The Union Iron Mills of Carnegie Bros. & Co., Limited, Pittsburgh, are furnishing to the Union Bridge Company about 4000 tons of steel bars and angles, which are to be used in the construction of the great bridge across the Hudson river at Poughkeepsie. A portion of the steel has already been delivered, and the remainder will be made and shipped within 90 days.

The proprietors of the Cambria Iron Works at Johnstown, Pa., have notified their employees that wages would be advanced 10 to 15 per cent. on and after the 16th inst. The advance will affect all employees except salaried men.

Over 200 men employed in J. R. Thompson & Co.'s steel works, Jersey City, have quit work and the factory is idle. They were recently visited by two walking delegates, who ordered them out. It was subsequently learned that the strike was due to non-union coal being used in the furnaces.

Gordon, Strobel & Laureau, Limited, of Philadelphia, have just made a contract with the Alabama Coal and Iron Company, of Sheffield, Ala., for two 18 x 75 furnaces with all appurtenances, to be completed by May, 1888. They have also contracted with General Warner, of Tusculum, Ala., for two 12 x 60 charcoal furnaces, to be built in Nashville, Tenn. Work to be commenced forthwith.

Machinery.

The Scoville Mfg. Company, Waterbury, Conn., have just had their annual meeting and have re-elected the old board of directors. The old officers were also elected, and the new business year is entered upon with excellent prospects.

The Standard Electric Time Company is the name of the company that has been organized at Waterbury, Conn., and which has purchased the plant there and also the Warner plant of the town of Derby. C. D. Warner, of Ansonia, the patentee of what is known as the Warner system, is the general manager, with George W. Chapman, of Waterbury, as assistant manager. The object of the company is to introduce the electric-light system into all of the leading cities of the State and to control the system wherever used. The general headquarters of the company are to be located in New Haven, where Mr. Warner will remove from Ansonia. In the near future plants will be started in New Haven, Hartford and Bridgeport. Wealthy capitalists are backing the project.

The Marinette Iron Works Company, of Marinette, Wis., Chicago office, No. 212 Lake street, have just contracted and shipped to the Fabst Mining Company, Ironwood, Mich., three outside band-friction hoists, 6 feet in diameter, making four of these plants this company have now in operation. Each hoist raises ore from the depth of 750 feet. These hoists are supplied with suitable engines to work them. They are also building a plant for the Ashland Mining Company, of Ironwood, Mich., comprising two 6-foot hoisting drums, to work to the same depth, and an engine to run them. Also for the Ironton Mining Company, of Wakefield, Mich., a plant of hoisting machinery, comprising four 5-foot hoisting drums, to raise ore from the depth of 600 feet each, with two engines to operate them. Also for the Bourne Mining Company, of Bessemer, Mich., a plant of two 4-foot hoisting drums, with engines to operate them, to work to a depth of 450 feet. The company are also building for the Hurley Syndicate and for W. H. Wadleigh and others a lot of small hoists for prospecting purposes. All of the above are for different mines embraced in the Gogebic range. In addition to this they are also furnishing a full equipment of mining skips, cages, ore cars, wire rope shears, &c. Besides these contracts they are building for the Mastodon Iron Mining Company, of Mastodon, Mich., a plant of hoisting machinery, consisting of two 5-foot drums, to hoist ore to a depth of 600 feet each, with an 18-inch engine to operate them.

It is reported that the Atchison Road will soon contract for 140 locomotives.

On the Lehigh Valley road the McKean coupler is being put on 100 locomotives.

E. P. Allis & Co., Milwaukee, Wis., are to furnish five extra large stationary engines for Carnegie Bros. & Co.'s new mill at the Bessemer Steel Works, in Braddock. Of these engines two are to be of 1500 horsepower, two of 600 and one of 700 horse power.

Merrill Bros., of Brooklyn, N. Y., are reported to be at work on an order for 80 drop hammers for the French Government. The hammers are to be used in the Government Arsenal for the manufacture of guns.

The Electric Light and Power Company, of St. Louis, Mo., recently incorporated with a capital of \$1,000,000, are developing an electric storage battery system, with a view of supplying electric energy for domestic and commercial lighting, and for all purposes for which power is used.

The Reliance Gauge Company, of Cleveland, Ohio, report the sale of their safety water columns steadily increasing.

The Adams & Price Locomotive and Machine Works, of Nashville, Tenn., are building a number of logging cars for various logging railways. The company's works are being increased by an addition of a new foundry 50 x 60 feet, a new car shop 50 x 100

Index to Advertisements

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A NEW DEPARTURE! The Smith & Wesson Hammerless, Safety REVOLVER

Calibres 32 and 44 in Preparation.
Provided with Automatic Shell Extractor
Rebounding Lock.



Calibre 38, Weight 1 1/2 lbs.
Now ready.
The Latest Production from the Works of
SMITH & WESSON, Springfield, Mass.,
Manufacturers of Superior Revolvers,
both Double and Single Action.

Absolute Protection from Accidental Discharge Insured.
Superiority in Every Point Universally Conceded.
SEND FOR DESCRIPTIVE CIRCULAR.

HARRINGTON & RICHARDSON'S

New Automatic

Double-Action

REVOLVER.



.32 and .38-cal., Central Fire, Nickel Plated, Rubber Stock, Simple,
Effective, Reliable. Sold everywhere by the Gun and Hardware
Trade. Ask your Dealers for them. Manufactured by
HARRINGTON & RICHARDSON, - Worcester, Mass.

THE BERLIN IRON BRIDGE CO.,

EAST BERLIN, CONN. * BINGHAMTON, N. Y.

CHAS. M. JARVIS,
Pres. and Chief Engineer.

BURR K. FIELD,
Sec'y and Treas.



Bridge at Lowell, Mass. Five Spans, 152 feet each. Roadway, 32 feet. Two Walks, 7 feet each.

IRON RAILROAD AND HIGHWAY BRIDGES.
IRON ROOFS COVERED WITH SLATE OR CORRUGATED IRON.

Corrugated Iron Fire-Proof Doors and Shutters.

PLATE AND BOX GIRDERS. GENERAL IRON CONSTRUCTION.

BUFFALO HAMMER COMPANY, Buffalo, N. Y., U. S. A.,

Manufacturers of a full line of

Solid Cast Steel Hammers, Sledges, Mauls,

R. R. TRACK TOOLS, &c.



Every Hammer or Tool having our name is fully warranted. Catalogues and discounts sent on application. Export orders will receive prompt and careful attention.



THE IRON AGE

MARK.

CULTIVATOR

AND HORSE-HOE.

ORIGINAL

Of this style of implement,

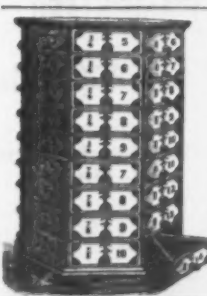
and still EXCELLING

ALL IMITATIONS.



Correspondence solicited from all dealers desirous of handling FIRST-CLASS GOODS. Address Manufacturers,

E. S. & F. BATEMAN, Spring Mills, N. J.



THE AMERICAN BOLT AND SCREW CASE CO.,

DAYTON, - OHIO,

MANUFACTURERS OF

Patent Revolving Bolt and Screw Cases.

We are the only manufacturers of Bolt Cases and the only parties who make lists of Bolt or Screw Cases to suit stock of purchaser without extra charge.

COMBINATION BOLT AND SCREW CASES TO ORDER.

Sold by the leading Jobbing Hardware Dealers. Send for Illustrated Circular. All Cases guaranteed.

PRICES REDUCED.—HUGONIN Improved Adjustable Screw SASH BALANCES. Mechanical Substitutes for Weights, 3 widths. Sashes work as with weights. No clock springs or lateness. They are applied to the frame and work against the unpainted edges of the sash. No. 3, 4 1/4 x 1 1/4; No. 2, 3 1/2 x 1 1/4; No. 1, 3 1/4 x 1 1/4. List price—gray, 75c, 54c, and 40c per set; malleable, 68c, 52c, and 38c. Robert B. Hugonin, Patentee and Solely Authorized Maker, is cast on the face-plate of genuine goods, by which they are instantly known. The unapproved have been fraudulently copied, with date of my minor patent, Nov. 6, 1877—never used on the grounds, and duly sold by misrepresentation to the injury of the buyer. Spot them! I still sell this style at half price. The improved are made under the care of the inventor and are warranted to give satisfaction. Send for reduced prices, discounts, &c. THE ROBT. B. HUGONIN, WISNOR FUTURE MFG. CO., Hartford, Conn., U. S. A.

LE PAGE'S PATENT RUBBER POCKET PISTOL CASE.

Protects the Pistol from Perspiration.



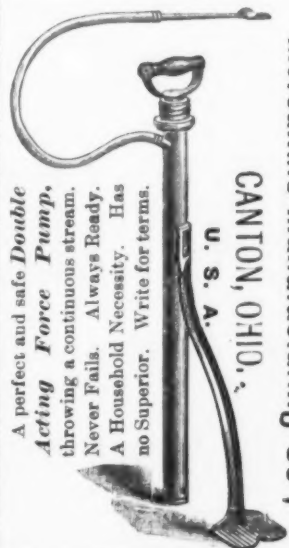
Permits instant withdrawal.

Flexible and easy in the pocket.

TOWER & LYON,

MANUFACTURERS,

95 Chambers St., New York.



Mercantile Manufacturing Co.,

CANTON, OHIO,

U. S. A.

"COMET" LAWN FORCE PUMP,
Pat. June 23, 1885.

A perfect and safe Double Acting Force Pump, throwing a continuous stream. Never fails. Always Ready. A Household Necessity. Has no Superior. Write for terms.

feet, and other additions to its productive capacity which will add materially to its extent and importance.

Lodge, Davis & Co., of Cincinnati, Ohio, are running full of orders and are several months oversold. They have increased their force one-third, and are now working 150 men.

The Niles Tool Works, in Hamilton, Ohio, recently furnished a steel tire turning lathe to the Cleveland, Columbus, Cincinnati and Indianapolis Railroad shops.

Hardware.

The Union Cutlery Company have been organized at Chicago, capital stock \$25,000. Incorporators, I. M. Brybil, M. M. Ohnstein and R. B. Toller.

The Penn Hardware Company, of Reading, Pa., who recently purchased the entire plant of the Perin & Gaff Mfg. Company, of Jeffersonville, Ind., for the manufacture of all kinds of butts, and removed the same to their plant in Reading, inform us that they started up this department of their works on the 7th inst. and are now manufacturing a full line of these goods.

Samuel Naylor proposes to introduce a new industry into East Chelmsford, Mass. He is forming a stock company with a capital of \$20,000, to manufacture knives, forks and small novelties.

The Moore Bros. Mfg. Company, of Chicago, have added to their line of hardware specialties the manufacture of the Blodgett automatic buttonhole attachment. This is described as a solid, strong and simple device, which can be attached to any sewing machine, is easily adjusted to the different sizes and styles of buttonholes, will stand as high a rate of speed as the sewing machine, and will be sold at a reasonable price. It is specially designed by the inventor for family use, and does not require a mechanical expert to adjust it. A patent has been applied for.

The Meadville Wire Nail Company, formerly the Sharon Wire Nail Company, have removed their machinery from Sharon to their new quarters in Meadville, Pa., and commenced, February 14, the manufacture of their patent wire nail machines, and wire nails of every description. They are giving special attention to their patent concave head finishing nail and brad, for which orders are reported coming in freely.

Horace Selleck, whose factory was destroyed by fire last November, is not manufacturing any goods the present year.

At the axe works of Hubbard & Co., Beaver Falls, business is quite brisk, and all departments are running full. The daily output is 900 axes, and 100 dozen hoes.

The Nashua Lock Company, Nashua, N. H., works are now in good running order again after a shut down of four weeks for alterations and improvements. They have added a new japan house and baking oven, a new tubular boiler of S. S. Jackman's make, and a new plating room, besides improving their plant in various ways. The changes will increase their facilities about one-third.

Miscellaneous.

The total shipments of coke from the Connellsville region last month were 26,500 cars, as against 27,000 cars for December. The decrease in shipments last month is due principally to the labor troubles in the Shenango Valley, Pa., and also in Cleveland, which have resulted in the banking of a number of furnaces and a consequent falling off in orders for coke. Of the total output, the syndicate marketed 18,300 cars and the outside producers 8200 cars. These were distributed as follows: West of Pittsburgh, 14,650; East of Connellsville, 5450; Pittsburgh and rivers, 6500. The figures for December were: West, 13,600; East, 6500; Pittsburgh, 6900. Of the 10,952 ovens now available in the Connellsville region but 200 are now idle, classified as follows: Pool ovens, 100; furnace ovens, 100.

A representative of the Pullman Palace Car Company has purchased 50 acres of ground at Turner and 5 acres at Argentine, both suburban towns near Kansas City, for the purpose of erecting workshops for the convenience of the company.

The Beaver Coal and Coke Company, with headquarters at New Castle, Pa., were chartered on the 8th inst, with a capital stock of \$50,000.

The Robt. Aitchison Perforated Metal Company, of Chicago, have closed contracts with J. E. Smith, of Shiloh, Ohio, and C. G. Cooper & Co., of Mt. Vernon, Ohio, for their season's supply of perforated metals.

A movement of the greatest importance to the building trades of Pittsburgh was taken last week by the association of brick manufacturers. Last year the price of hard brick was \$3 per 1000, and for soft brick \$7.50. At a meeting held on the 10th inst, the association decided to cut the price of hard brick to \$7, and of soft brick to \$6.50. This is a reduction of \$1 per 1000, and it is thought, will have a great bearing in giving Pittsburgh a building boom this year.

A large natural gas company was incorporated at Columbus, Ohio, on the 12th inst. The territory named in the articles of incorporation includes the counties of Mercer, Starke, Shelby, Miami, Champaign, Clarke, Greene, Montgomery, Preble, Butler, Warren and Hamilton. The city of Dayton is to be made headquarters of the company. The capital stock is fixed at \$2,000,000, divided into 20,000 shares of \$100 each.

The Peninsula Car Works Company, of Detroit, Mich., have purchased ten acres of land west of the site of their present works. The works will be enlarged next spring.

The Shenango Valley Furnace strike has ended, the result of a mass meeting held at Sharon. The men return to work at the same wages they refused 10 days ago, when an advance of 15 cents was offered. This they got instead of the 25 cents asked for, but if pig iron is sold for \$20 on April 1, the additional 10 cents will be granted them.

Design Patents.

We are indebted to Messrs. Hawson & Sons, Philadelphia, for a copy of the act which has recently been passed touching design patents, and which is of interest and importance to all persons having an interest in that class of patents. The shape, configuration or ornamentation of an article of manufacture very frequently forms a material element in the popularity and merchantability of the article, and the exclusive right to such shape, configuration or ornamentation, therefore, is of great or considerable value to the manufacturer; but heretofore the rules applied by the courts to the ascertainment of profits and damages arising out of the infringement of design patents have made it always difficult, and in some cases impracticable, for the complainant to prove profits or damages and to obtain any money recovery for the infringement of his rights, so that design patents have not had that value to their owners which they should have. This new act is intended to remedy the mischief, by providing that the infringer of a design patent shall be liable to what may be termed a "penalty" of \$250, as well as for any profits in excess of that amount which complainant may prove to have been derived from the infringement. This seems well calculated to make design patents much more effective and valuable to their owners than they have ever been before. The following is the text of the act:

AN ACT TO AMEND THE LAW RELATING TO PATENTS, TRADE-MARKS AND COPYRIGHT.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

That hereafter, during the term of letters patent for a design, it shall be unlawful for any person, other than the owner of said letters patent, without the license of such owner, to apply the design secured by such letters patent or any colorable imitation thereof, to any article of manufacture for the purpose of sale, or to sell or expose for sale any article of manufacture to which such design or colorable imitation shall, without the license of the owner, have been so applied. Any person violating the provisions, or either of them, of this section shall be liable in the amount of \$350; and in case the total profit made by him from the manufacture or sale, as aforesaid, of the article or articles to which the design or colorable imitation thereof has been applied, exceeds the sum of \$250, he shall be further liable for the excess of such profit over and above the sum of \$250; and the full amount of such liability may be recovered by the owner of the letters patent, to his own use, in any circuit court of the United States having jurisdiction of the parties, either by action at law or upon a bill in equity for an injunction to restrain such infringement.

Sec. 2.—That nothing in this act contained shall prevent, lessen, impeach or avoid any remedy at law or in equity which any owner of letters patent for a design, aggrieved by the infringement of the same, might have had if this act had not been passed; but such owner shall not twice recover the profit made from the infringement.

Approved February 4, 1887.

Correction by Messrs. Charles Himrod & Co. of a False Report.—We are in receipt of the following self-explanatory letter from Messrs. Charles Himrod & Co., dated Chicago, February 10: "We understand it has been reported by persons unknown to us that the Calumet Furnace, owing to our large sales of Bessemer iron, would not be in shape to supply customers with pig iron for foundry purposes. In order to correct this impression, if it has obtained any foothold, we desire to say that it is the intention and expectation to manufacture enough foundry iron to furnish all customers with what they may need. We will continue its manufacture in such quantities as may be necessary, using the same ores during the coming year as through the past and maintaining the same quality of iron. Parties desiring to use it steadily in their mixture can rest assured that we will make every endeavor to keep them supplied and merit their continued patronage. With a capacity of 80,000 to 90,000 tons a year at the Calumet and Minerva furnaces, we think we can fill all ordinary calls for foundry irons. We wish also that our friends would, in case they hear such reports, apply to us for information, as we expect to be able to give them more reliable statements in regard to our own business than any one else can."

Mr. F. C. G. Muller recommends for lecture purposes a large thermometer filled with sulphuric acid, blackened by a little sugar. Sulphuric acid expands regularly, and as its coefficient of expansion is three and one-half times as great as that of mercury slight variations of temperature during experiments may be seen by a large class. Successive spaces of 10° of the scale, which is placed back of the thermometer, are differently colored, so that the audience can readily read the level of the acid.

Park, Bro. & Co., of Pittsburgh, are meeting with much success in introducing their Imperial self hardening steel among machinists and others who have been in the habit of using Mushet's special steel and other high-grade imported steels. Their experiments in producing steel of this character required much time and great expense, and they are now reaping the benefit. The price of Imperial self hardening steel is 45 cents per pound.

Furnace and Factory is the name of a new publication issued at Birmingham by the *Planers' Journal and Southern Iron Worker Company*. With a field full of promise, and Mr. N. C. Colton to take care of it, the new venture should have a prosperous career.

The American Exhibition at London will open on the 2d of May, this year. Information concerning it may be obtained by addressing the main office, 702 Chestnut street, Philadelphia, or J. G. Speed, secretary, Stewart Building, New York.

LOVELL, TRACY & CO.,

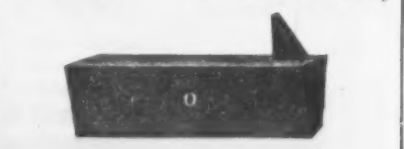
71 Asylum St., Hartford, Conn.

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PATENT STEEL Toe Calks,



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This
WAINWRIGHT
EXPANSION JOINT
prevents leakage of joints and
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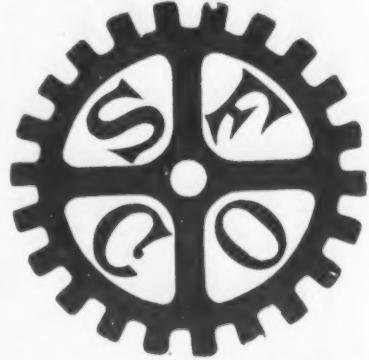
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The Wainwright Expansion Joint is constructed of corrugated copper seamless drawn tubing, which possesses great longitudinal flexibility, and absorbs the strain caused by the expansion and contraction. It is fitted at both ends with screw or flanged surfaces, for connection. These Joints are positive, doing away with Stuffing Boxes and packing.

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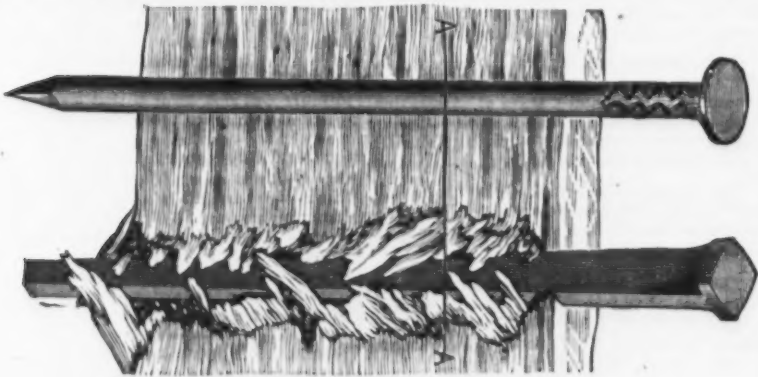
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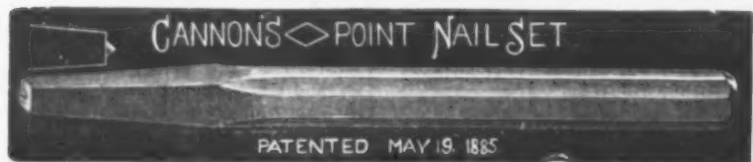
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for Watch, Clock, Piano and Cabinet Makers, Jewelers, Printers, Electrotypers, Dentists, Amateurs, Carpenters, Builders, Machinists and also every kind of Mechanic or Artisan. Give American Mechanics a chance to buy American, instead of Foreign Tools.

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A great improvement over the old style. Prevents slipping from head of the nail. Made of best quality Tool Steel. Carefully tempered. Appreciated and bought at sight by all mechanics. Price on application. Made only by
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Patented in this and other Countries

May be applied to any door or window in a few seconds. When the door is opened or the window raised the Alarm falls to the floor, exploding a No. 3 blank cartridge.

Packed complete with four cartridges, weight 6 ounces. Endorsed by Hon. Wm. B. Smith, Mayor of Philadelphia, and Hon. James A. Stewart, Chief of Police.

Having improved the Alarm and are now manufacturing them in large quantities, we are prepared to quote lower prices than heretofore—viz., \$1.50 per dozen, or \$18.00 per gross; no charge for boxing or cartage.

Sample sent by mail on receipt of six cents. We furnish handsome gilt signs and frames with every order.

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Orange Lightning, Orange Ducking
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More popular than any Powder now in use.

BLASTING POWDER and ELECTRICAL BLASTING APPARATUS. MILITARY POWDER on hand and made to order.

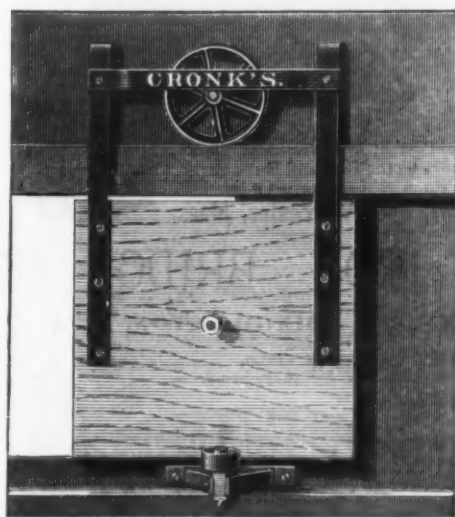
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ANTI-FRICTION.



IT EXCELS ALL OTHERS

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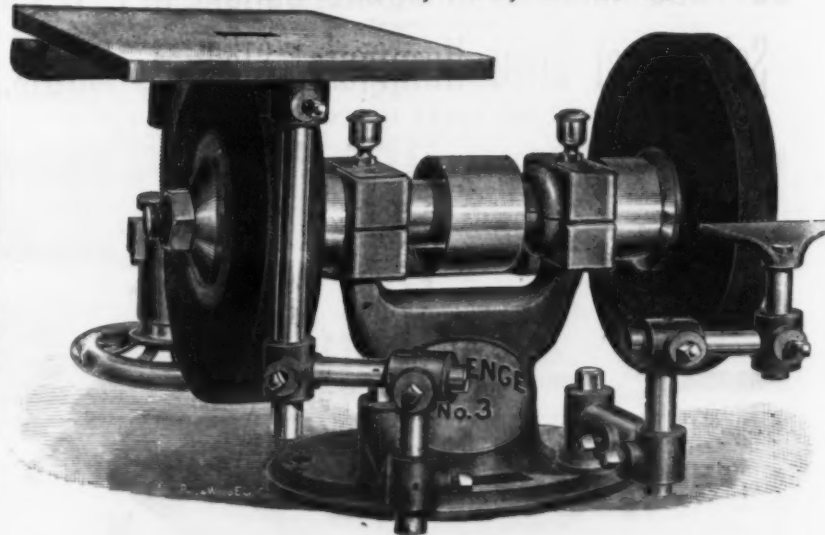
In ease of motion.

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This Hanger and Iron-Clad Track costs less than others that are not as good, and it sells at sight. Requires no oil. Has no flange wheels. Cannot break or get off the track.

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No. 1 Grinder with surface grinding attachment. Size of Surface Plate 24 inches, for grinding Die Plates, Flat Irons, Spirit Levels, Lock Fronts, Etc. The machine is indispensable wherever a perfectly true flat surface is required. Price of grinder and surface attachment complete \$35. For sale by leading machinery dealers in the United States. See Catalogue.



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FIRE SET AND STAND,

Shovel, Poker and Lifter

Never Becomes Heated
to Burn the Hands.

WIRE COILED IN ANY SHAPE.

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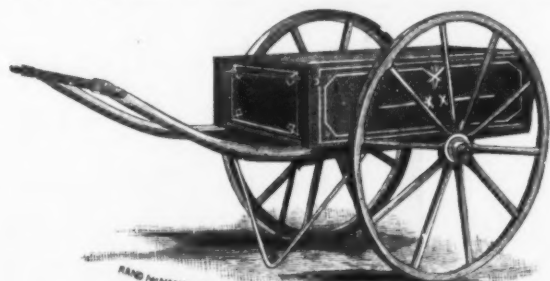
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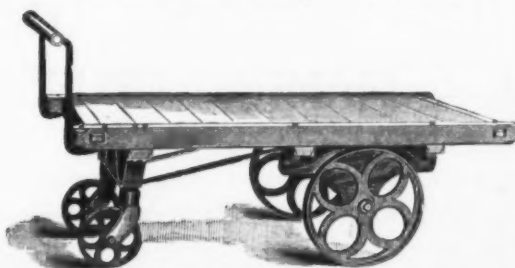
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THE REYNOLDS IMPROVED TRUCK.

Front Wheels Casters. Truck turns in its own length. Runs on or off elevator or scales at any angle. Is easily dumped by lifting handle. Any size. Send for circular.



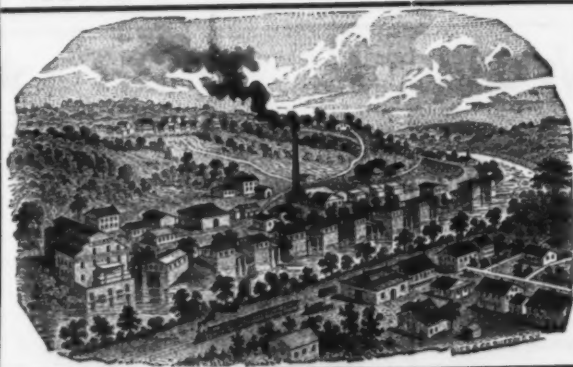
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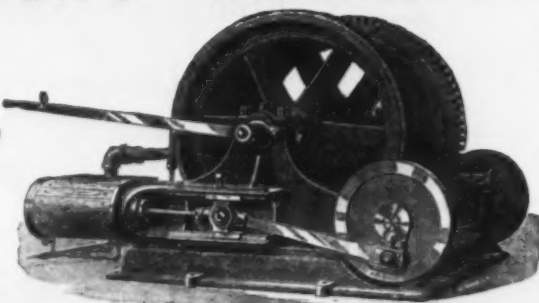
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Mines,
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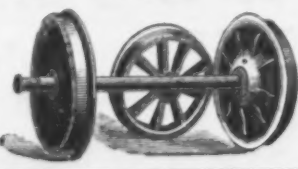
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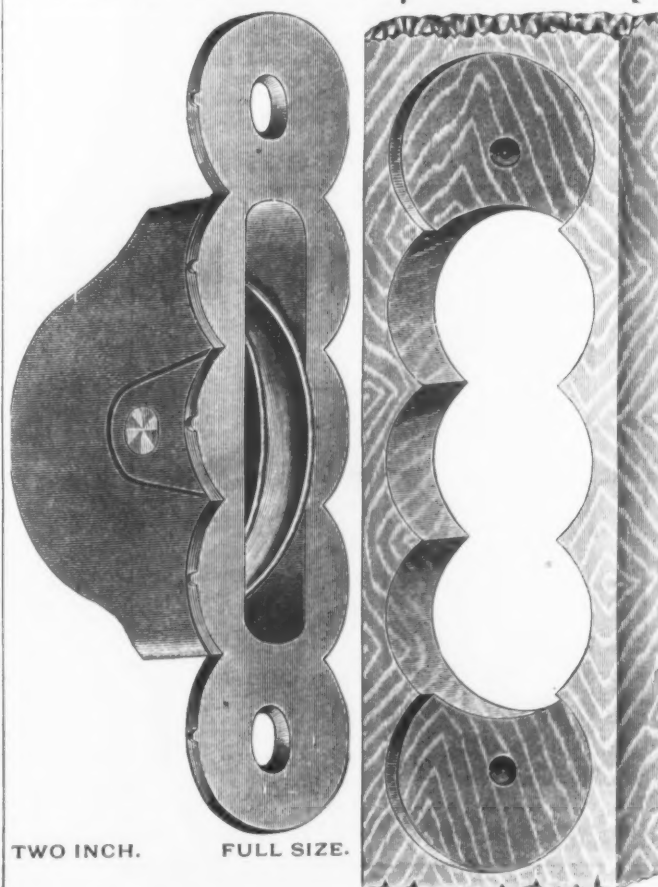


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The only Pulley the trade can handle with profit.

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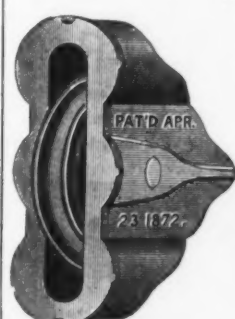
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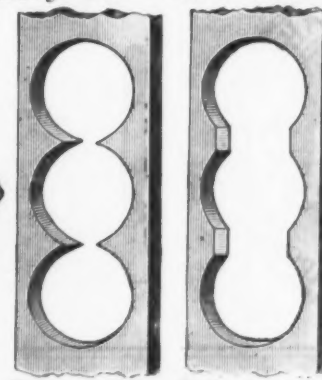
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Each Pulley Its Own Marking Gauge.



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Mortise as made by the bit. Mortise after the pulley has been driven in.

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Impossible for the cord to run off. Applied to the frame in less time than it takes to describe the operation.

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SEE THAT OUR STAMP IS IN THE HEAD OF EACH AXE. IT IS A GUARANTEE OF A 1 QUALITY.

All-Steel Axes, Hatchets and Adzes. Peerless Broad-Axes the Best in the World.

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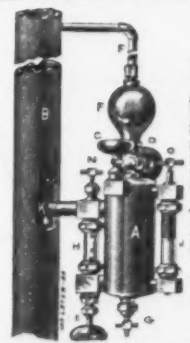
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PIPES.
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Send for Illustrated Pamphlet, and mention The Iron Age.

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are pronounced the best by more than 20,000 users. Simple in operation and always reliable. A Lubricator sent on 30 days' trial to responsible parties. "I would not take five times the cost of my Lubricator if I could not get another." is the statement often made by users. Liberal discount to the trade. Send for circular and price list.
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Noiseless, Self-Setting, Always Ready, Easily Cleaned.

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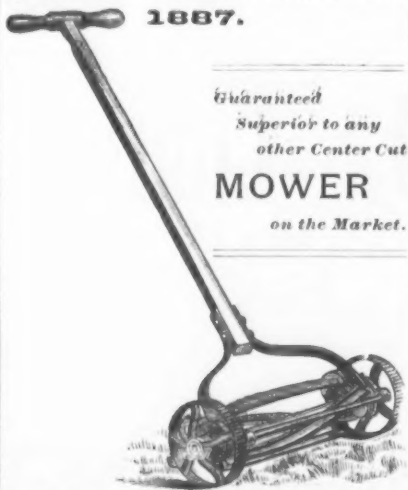
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The trade will soon find an ordinary and roughly-made Reel of blades and stationary knife is not all that is required to make a perfect Lawn Mower.

THE
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Guaranteed
Superior to any
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NOW, WHY BUY A WORTHLESS MOWER?

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DOUBLE GEAR.

The Cylinder Knives are solid cast steel, made by a patented process: are hardened and tempered in oil, self-sharpening, and never require a file or stone after leaving the factory. All the bearings are long, so that the wear on the Mower will be slow, and oil seldom required. It is made to run at high speed, and will not only cut higher grass, but leaves the lawn perfectly smooth.



Continental Lawn Mower.
1887.

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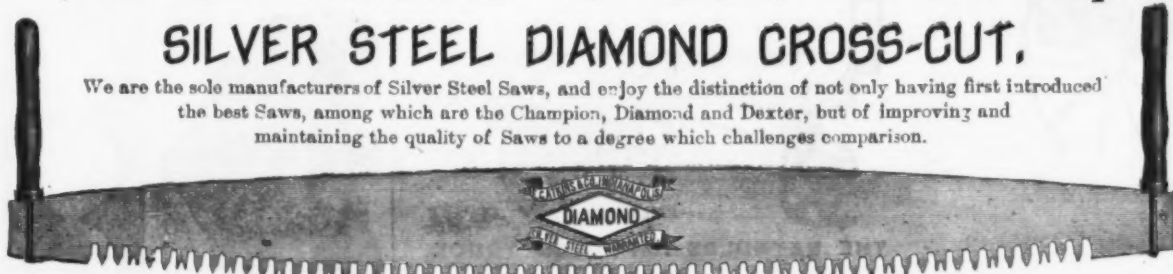
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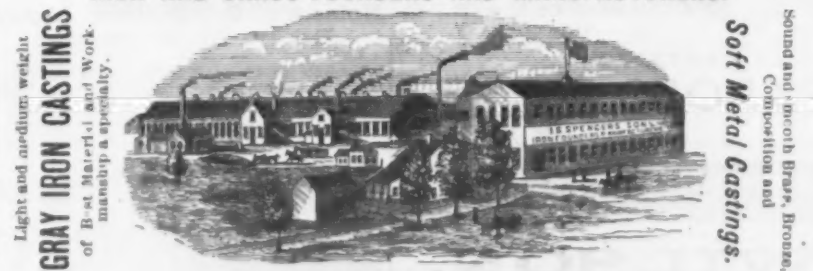
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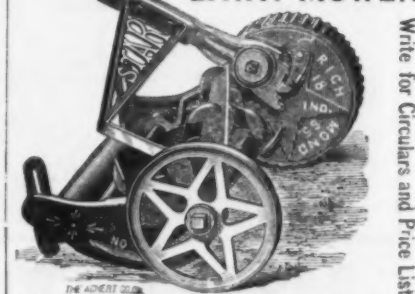
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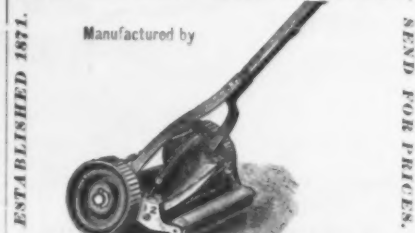
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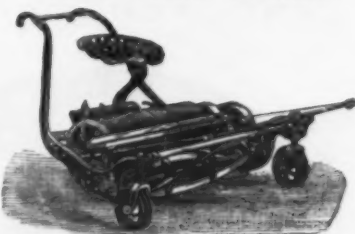
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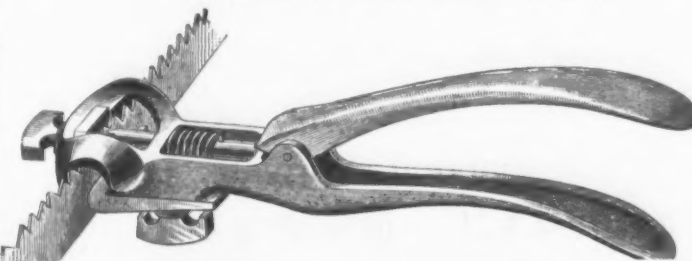


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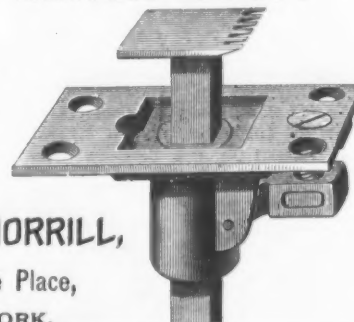
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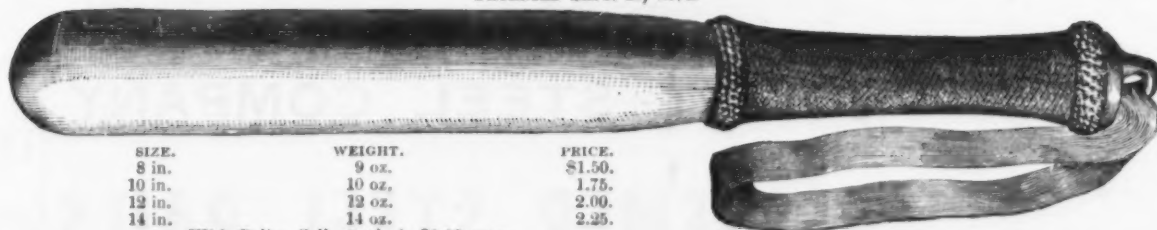
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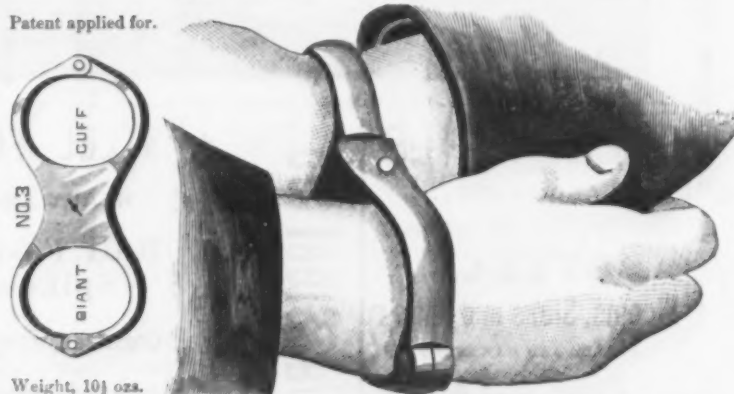
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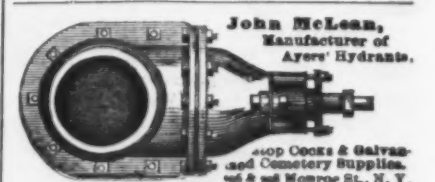
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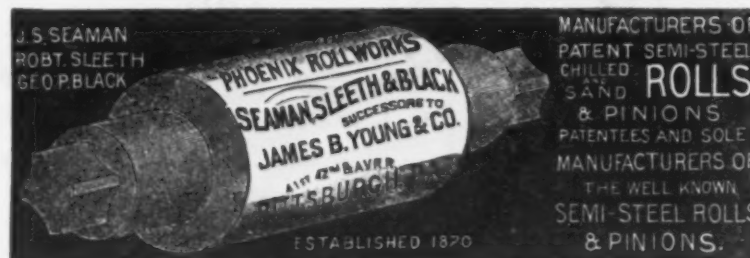
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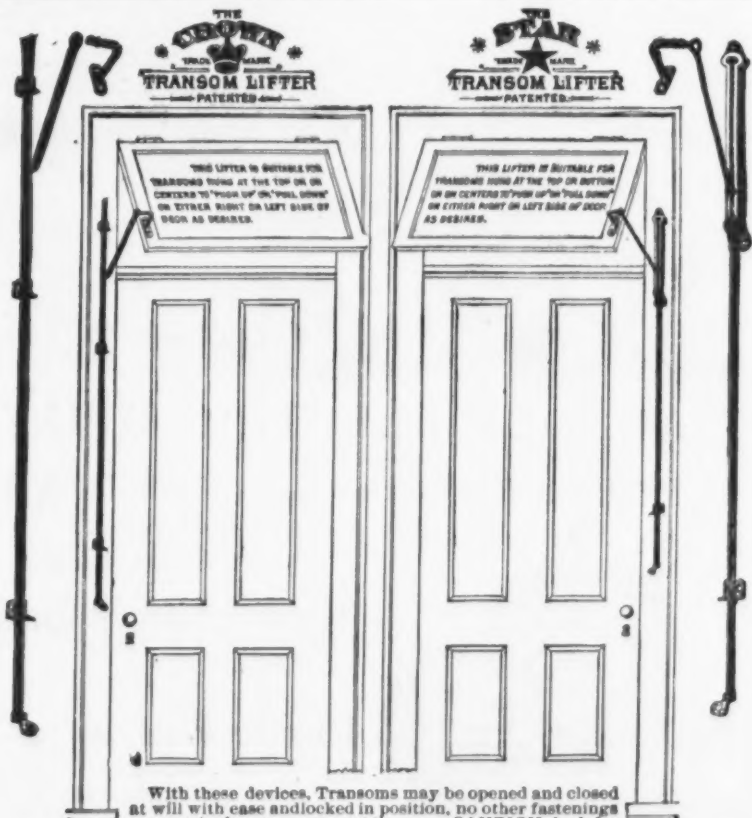
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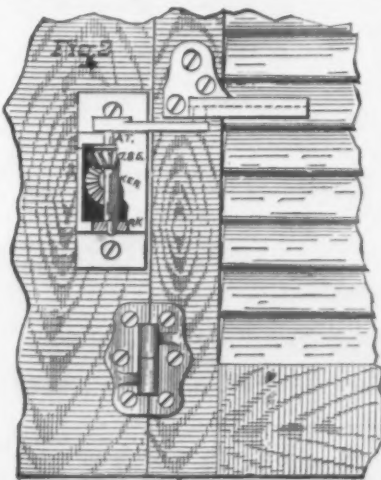
With these devices, Transoms may be opened and closed at will with ease and locked in position, no other fastenings are required, any one can put them on. CAUTION, look for the Trade Mark on the handles.
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Price List "Crown" Lifters.				LIST.		Price List "Star" Lifters.			
No	Length	Size of Rod.	Price Each.	APRIL 8th	No.	Length	Size of Rod.	Price Each.	
43	3 feet	1/2 x 1/2	Bronzed Iron.	\$0.55	83	3 feet	1/2 x 1/2	Bronzed Iron.	\$0.70
44	4 "	" "	" "	0.65	84	4 "	" "	" "	0.80
45	5 "	" "	" "	0.75	85	5 "	" "	" "	0.90
43 1/2	3 "	" "	Nickel Plated.	1.75	83 1/2	3 "	" "	Nickel Plated.	2.00
44 1/2	4 "	" "	" "	2.00	84 1/2	4 "	" "	" "	2.25
45 1/2	5 "	" "	" "	2.25	85 1/2	5 "	" "	" "	2.50

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TILE & FURNACE BLOCKS,
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The Best Window Cleaner now in the Market.
WHY?

1st. It is so constructed that the Rubber can never get out of the barrel without taking out the lock pin.
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Delusion and Bonanza Mouse Traps
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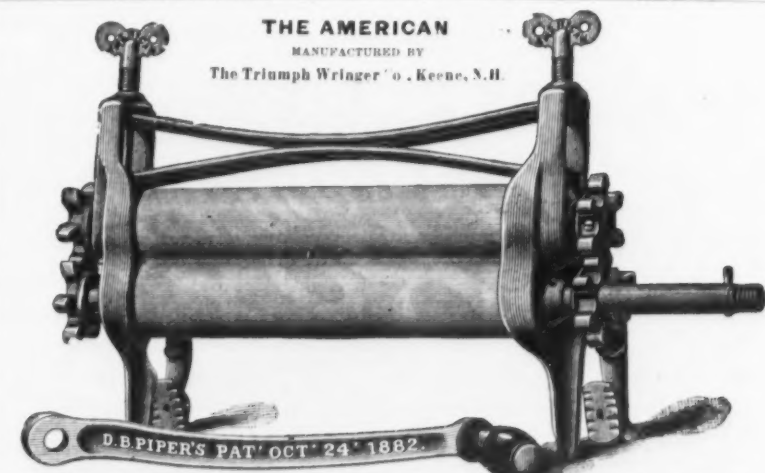
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hand. It does not grind impurities
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With one hand grasp the Wooden
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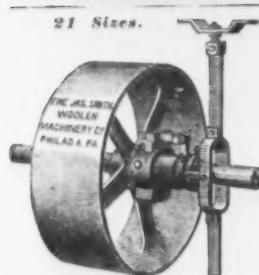


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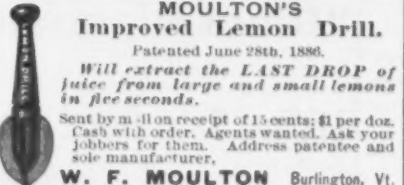
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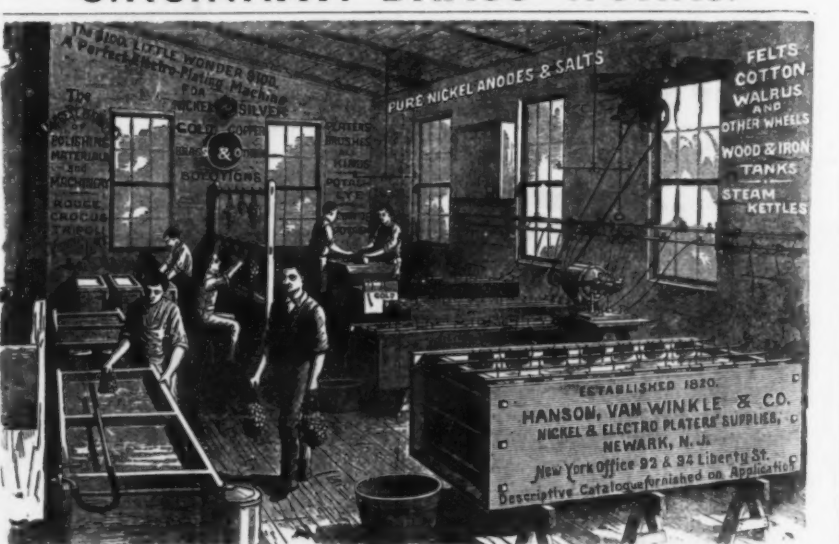
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1 1/2 to 4 by 1/2 to 1, 2.10 1 1/2 and 1 1/2 by 1/2 to 1, 2.20
1 1/2 to 4 by 1/2 to 1, 2.20 1 1/2 and 1 1/2 by 1/2 to 1, 2.30

Round and square.
1 1/2 to 4 by 1/2 to 1, 2.00 1/4 and 1 1/2 by 1/2 to 1, 2.10
1 1/2 to 4 by 1/2 to 1, 2.10 1 1/2 and 1 1/2 by 1/2 to 1, 2.20
1 1/2 to 4 by 1/2 to 1, 2.20 1 1/2 and 1 1/2 by 1/2 to 1, 2.30

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1 1/2 to 4 by 1/2 to 1, 2.20 1 1/2 and 1 1/2 by 1/2 to 1, 2.30

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1 1/2 to 4 by 1/2 to 1, 2.20 1 1/2 and 1 1/2 by 1/2 to 1, 2.30

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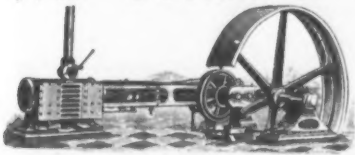
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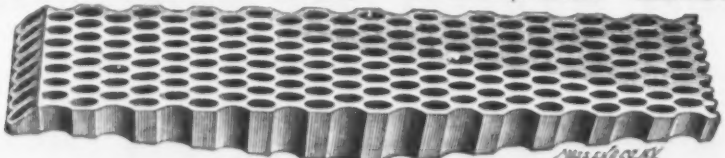
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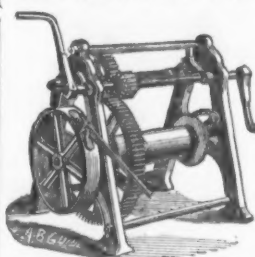
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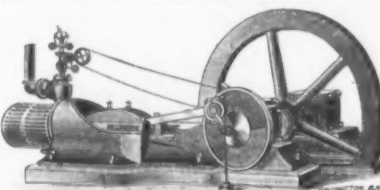
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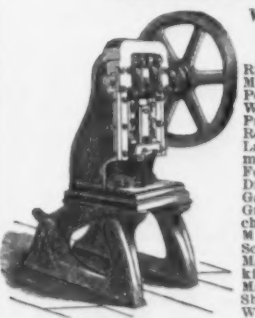
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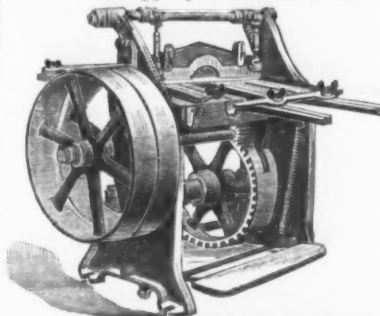
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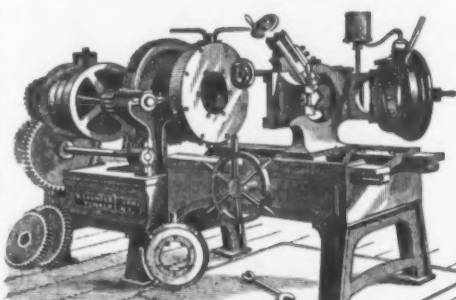
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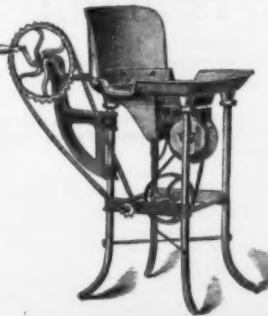
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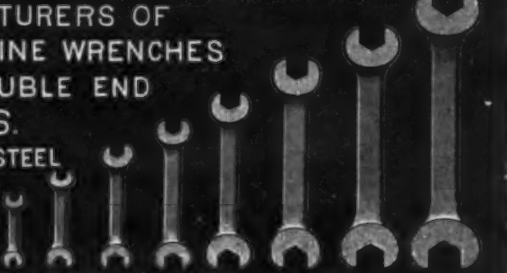
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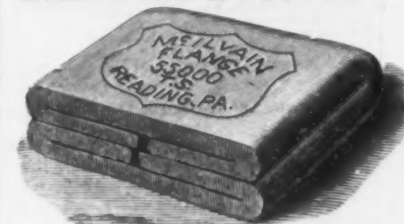
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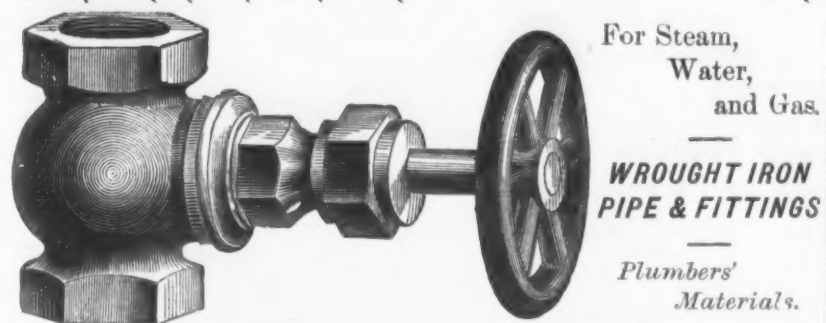
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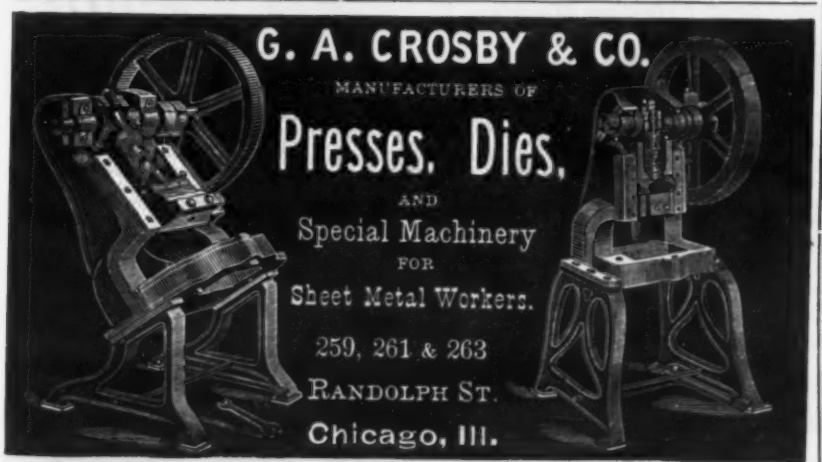
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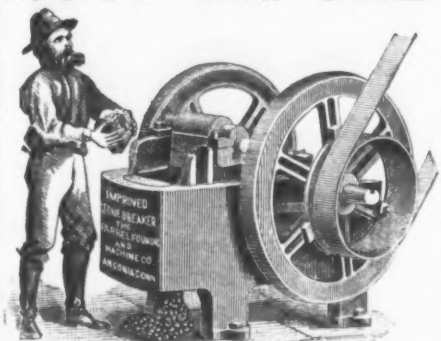
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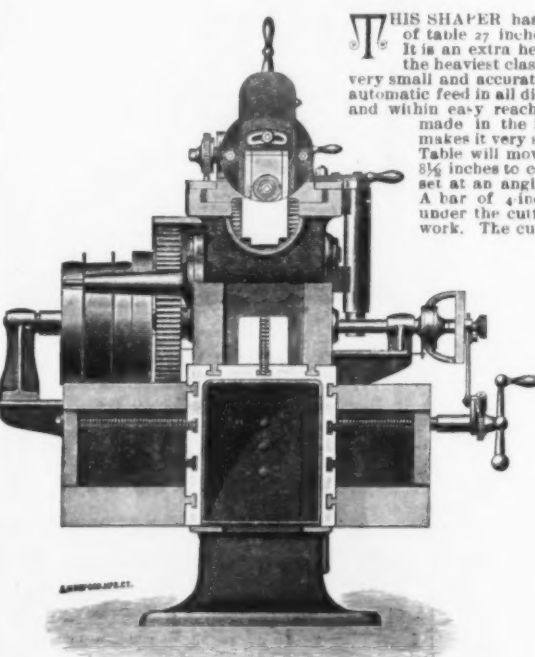
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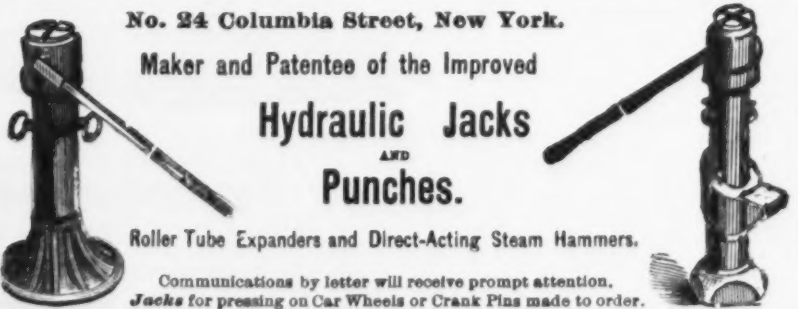
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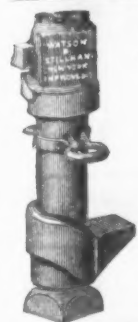
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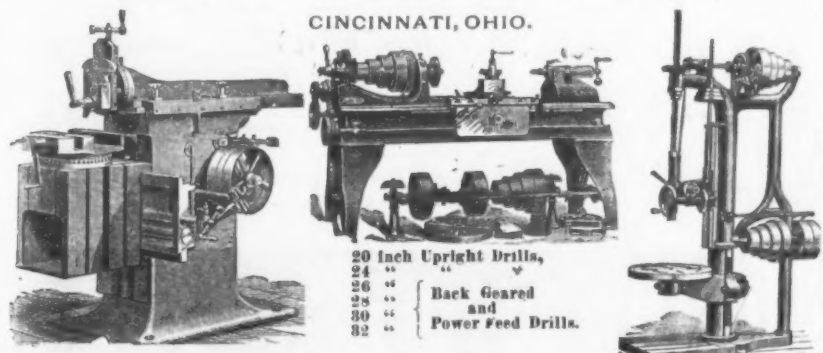
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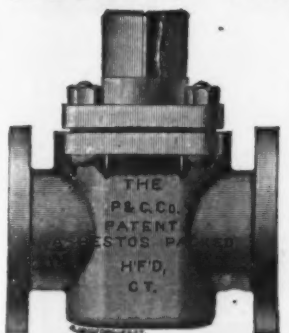
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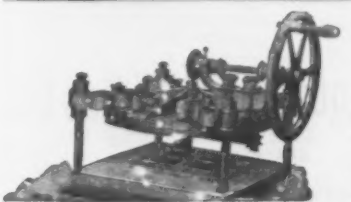
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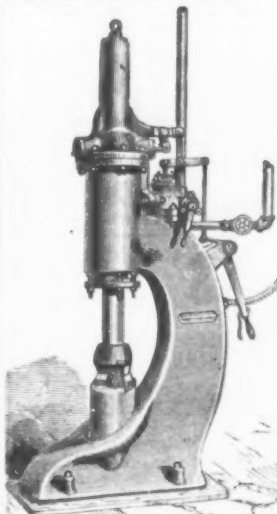
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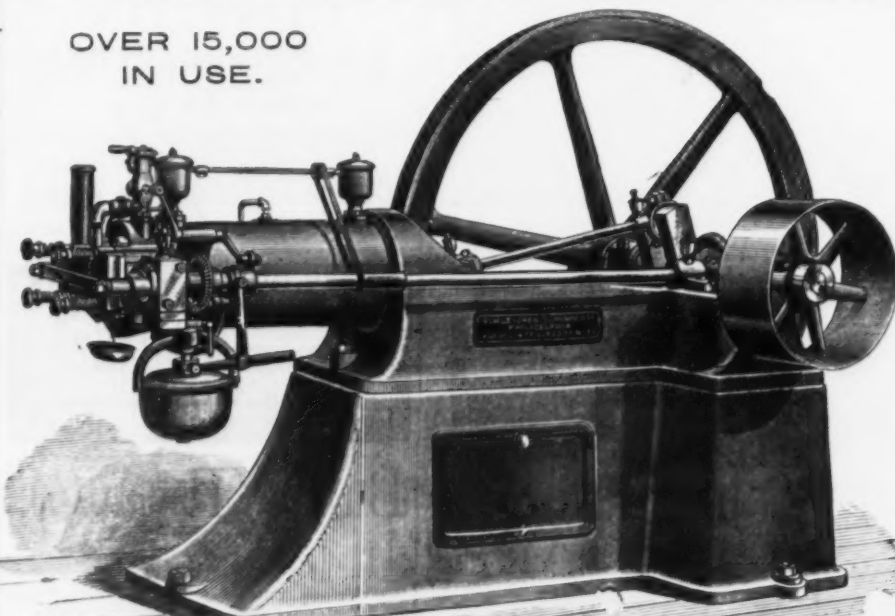
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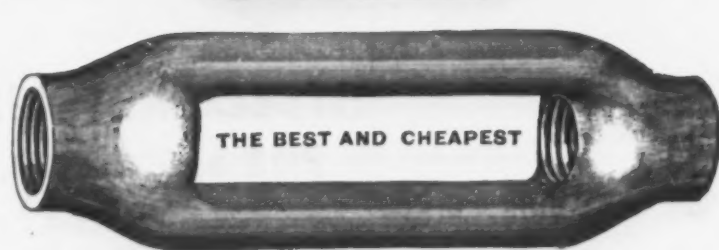
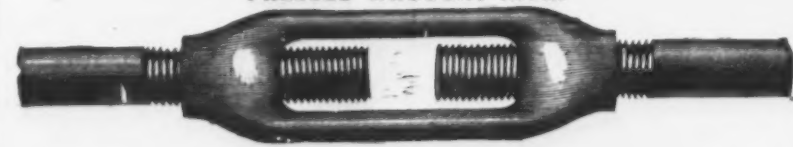
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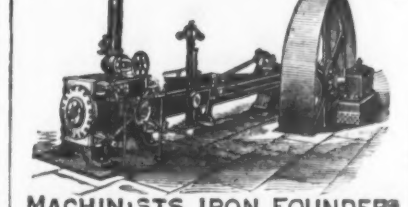
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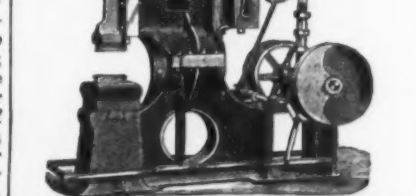
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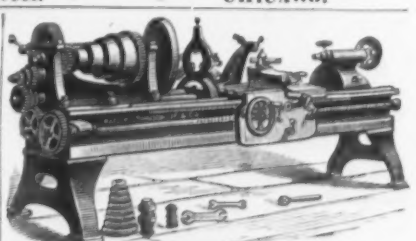
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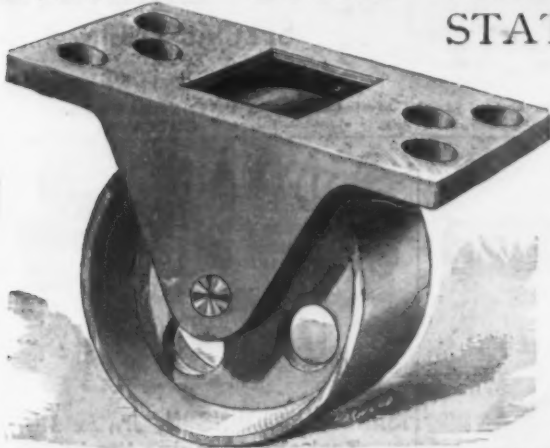
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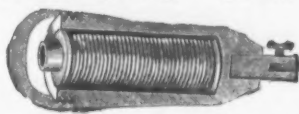
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